

REPORT
OF THE
MINISTER OF AGRICULTURE
FOR THE
DOMINION OF CANADA
FOR THE
YEAR ENDED MARCH 31, 1923

PRINTED BY ORDER OF PARLIAMENT



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

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REPORT
OF THE
MINISTER OF AGRICULTURE
1922-1923

*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,
G.C.M.G., M.V.O., Governor General and Commander in Chief of the
Dominion of Canada—*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit to Your Excellency a Report of the Department of Agriculture for the fiscal year ended March 31, 1923.

The work of the Department was carried out in a most efficient and satisfactory manner and there will be found included herein a summary of the operations of the different Branches of the Department, all of which is laid before Your Excellency under their respective headings.

The legislation affecting the Department during the period consisted of:—

Chapter 5, 12-13 George V, intituled "An Act to regulate the Sale of Agricultural Fertilizers." (Assented to June 28, 1922.)

Chapter 7, 12-13 George V, intituled "An Act to amend the Animal Contagious Diseases Act." (Assented to June 28, 1922.)

Chapter 35, 12-13 George V, intituled "An Act to amend The Oleomargarine Act, 1919." (Assented to June 28, 1922.)

Chapter 43, 12-13 George V, intituled "An Act to regulate the Sale and Inspection of Root Vegetables." (Assented to June 28, 1922.)

By Order in Council approved under date April 21, 1922, there was constituted an Advisory Board for the purpose of carrying out the provisions of "The Destructive Insect and Pest Act," 9-10 Edward VII, Chapter 31, and the regulations thereunder. (*Vide Canada Gazette*, Vol. LV, p. 4572.)

By Proclamation under date July 24, 1922, "An Act to regulate the sale of Agricultural Fertilizers" shall come into operation on, from and after, August 5, 1922. (*Vide Canada Gazette*, Vol. LVI, p. 561.)

By Order in Council approved under date August 2, 1922, by virtue of the provisions of section 11 of "The Root Vegetables Act, 1922," regulations, relative to containers in which potatoes shall be packed, were established. (*Vide Canada Gazette*, Vol. LVI, p. 662.)

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By Order in Council approved under date August 11, 1922, by virtue of the provisions of section 8 of "The Oleomargarine Act," as amended, the regulations relative to the importation, manufacture and sale of oleomargarine in Canada as established by Orders in Council of August 30, 1920, and April 9, 1921, were rescinded and new regulations established in lieu thereof. (*Vide Canada Gazette*, Vol. LVI, p. 779.)

By Order in Council approved under date September 25, 1922, by virtue of the provisions of subsection (c) of section 9, of "The Live Stock and Live Stock Products Act, 1917," the regulations respecting the grading and marketing of eggs, as established by Order in Council of April 5, 1918, were rescinded and new regulations approved in lieu thereof. (*Vide Canada Gazette*, Vol. LVI, p. 1484.)

By Order in Council approved under date October 14, 1922, by virtue of the provisions of section 9, of "The Live Stock and Live Stock Products Act," chapter 32 of the Statutes of 1917, as amended, regulations respecting the grading of hogs were established. (*Vide Canada Gazette*, Vol. LVI. See Supplement of October 14, 1922.)

By Order in Council approved under date December 11, 1922, section 40 of the regulations under "The Meat and Canned Foods Act" was amended by the addition of the words: "Or from the province of Nova Scotia to Newfoundland and St. Pierre until March 15, 1923." (*Vide Canada Gazette*, Vol. LVI, p. 2634.)

By Order in Council approved under date December 11, 1922, regulations for the eradication of bovine tuberculosis from restricted areas were established. (*Vide Canada Gazette*, Vol. LVI, p. 2634.)

By Order in Council approved under date January 19, 1923, amendments were made to sections 18 and 19 of the Egg Regulations established by Order in Council approved September 25, 1922 (P.C. 2001.) (*Vide Canada Gazette*, Vol. LVI, p. 3232.)

By Proclamation under date January 15, 1923, the municipalities of Dufferin, Thompson and Rolland were set apart as a restricted area, in virtue of the regulations made under the provisions of "The Animal Contagious Diseases Act," chapter 75, R. S. C. 1906, for the purpose of assisting in the eradication of bovine tuberculosis in the province of Manitoba. (*Vide Canada Gazette*, Vol. LVI (Extra January 27, 1923, also p. 3286.)

By Order in Council approved under date February 26, 1923, in virtue of the provisions of section 3 of chapter 28 of the Statutes of George V, 11-12, intituled "An Act to regulate the grading of Dairy Produce," regulations thereunder were established. (*Vide Canada Gazette*, Vol. LVI, p. 3785.)

By Order in Council approved under date February 26, 1923, in virtue of the provisions of sections 3 and 4 of "The Destructive Insect and Pest Act," 9-10 Edward VII, chapter 31, Ministerial Orders known as Supplements Numbers 1 and 2 to Quarantine No. 1 (Domestic), approved respectively on August 21, 1920, September 25, 1920, and November 15, 1921, restricting the movement of nursery stock in certain areas in the province of Nova Scotia, on account of the apple sucker were rescinded and new restrictions made in lieu thereof. (*Vide Canada Gazette*, Vol. LVI, p. 3786.)

By Order in Council approved under date February 26, 1923, in virtue of the provisions of sections 3 and 4 of "The Destructive Insect and Pest Act," 9-10 Edward VII, chapter 31, Ministerial Orders known as Supplements Numbers 1 and 2 to Quarantine No. 2 (Domestic) Revised, effected respectively on

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September 5, 1922, and September 27, 1922, restricting the removal of corn fodder or cornstalks, etc., from certain areas in the province of Ontario, on account of the spreading of the European corn borer, were rescinded and new restrictions substituted in lieu thereof. (*Vide Canada Gazette*, Vol. LVI, p. 3787.)

By Order in Council approved under date February 26, 1923, amendments were made to the regulations under "The Destructive Insect and Pest Act," established by Order in Council approved July 17, 1917, by adding subsection "j" to section 7 thereof. (*Vide Canada Gazette*, Vol. LVI, p. 3790).

By Order in Council approved under date March 13, 1923, further amendments were made to the regulations, under and in virtue of the provisions of subsection (c) of Section 9 of "The Live Stock and Live Stock Products Act, 1917," respecting the grading and marking of eggs as established by Order in Council approved January 19, 1923. (*Vide Canada Gazette*, Vol. LVI, p. 4121.)

DOMINION EXPERIMENTAL FARMS AND STATIONS

The growing season of 1922 was a very favourable one in most parts of the Dominion of Canada, although in certain sections, such as in British Columbia, northern and central Alberta and Saskatchewan, there was a marked lack of precipitation until the end of July. In other districts of the West, however, the rainfall was ample and crops were better than any harvested since 1915. In Manitoba, Ontario, Quebec and the Maritime Provinces, grain crops were generally good.

The total value of all field crops of the Dominion in 1922 has been estimated by the Dominion Bureau of Statistics at \$962,616,200, as compared with \$931,863,670 in the previous year. Below are given some data as to the yield and value of the field crops in 1922 and in the second table an estimate of the various classes of live stock in Canada during the period 1918 to 1922, inclusive, is given.

AREAS AND ESTIMATES OF YIELD AND VALUE OF FIELD CROPS, 1922

Crop	Area	Yield per acre	Total yield	Weight per measured bushel	Average price per bushel	Total value
	acres	bush.	bush.	lbs.	\$	\$
Fall wheat.....	892,569	21.25	18,956,000	59.91	1.01	19,059,000
Spring wheat.....	21,530,124	17.75	380,830,400	60.31	0.84	320,360,000
All wheat.....	22,422,693	17.75	399,786,400	60.24	0.85	339,419,000
Oats.....	14,541,229	33.75	491,239,000	35.68	0.38	185,455,000
Barley.....	2,599,520	27.75	71,865,300	47.66	0.46	33,335,300
Rye.....	2,105,367	15.50	32,373,400	55.71	0.58	18,703,200
Peas.....	189,890	18.00	3,428,600	60.08	1.79	6,141,200
Beans.....	79,899	16.25	1,303,300	59.39	2.85	3,713,800
Buckwheat.....	430,982	22.50	9,701,200	47.80	0.84	8,140,800
Mixed grains.....	779,800	35.50	27,707,700	44.33	0.60	16,500,700
Flax.....	565,479	8.85	5,008,500	55.04	1.72	8,638,900
Corn for husking.....	318,397	43.25	13,798,000	55.45	0.83	11,509,700
Potatoes.....	683,594	81.55	55,745,300	.....	0.90	50,320,000
Turnips, mangels, etc.....	224,256	196.10	43,973,500	.....	0.54	23,886,000
		Tons	Tons		Per ton	
Hay and clover.....	10,001,667	1.45	14,488,200	.....	13.46	194,950,000
Fodder corn.....	654,624	9.00	5,879,000	.....	4.97	29,197,600
Sugar beets.....	20,725	9.20	190,400	7.88	1,500,000
Alfalfa.....	305,933	2.65	806,400	12.77	10,295,000

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NUMBER OF FARM LIVE STOCK IN THE DOMINION, 1918-22

Live Stock	1918	1919	1920	1921	1922
Horses.....	3,609,257	3,667,369	3,400,352	3,813,921	3,648,871
Milch cows.....	3,538,600	3,548,437	3,504,692	3,736,832	3,745,804
Other cattle.....	6,507,267	6,536,573	6,067,504	6,469,373	6,074,065
Sheep.....	3,052,748	3,421,958	3,720,783	3,675,860	3,262,626
Swine.....	4,289,682	4,040,070	3,516,678	3,904,895	3,915,684

Excellent progress has been made with the experimental work of the Branch during the year. Several important additions or replacements have been made in the personnel, such as, the appointment of a new Dominion Cerealists, a new Dominion Agrostologist and also the appointment of a Dominion Agricultural Bacteriologist, to head the newly formed division of that name.

On the branch Farms, work productive of excellent results may be reported from all points and it may be especially noted that the new Station at Swift Current, Sask., where such important problems in relation to dry farming are to be studied, was got into good condition for the commencement of experimental work and a great deal of such work actually put under way. Still greater progress might have been made throughout the system had it been found possible to secure a larger appropriation for the erection of buildings, some lines of experimental work being practically held up for lack of building accommodation.

During the year a considerable number of new publications or revises of old ones were sent in to press, together with reports from the branch Farms and Stations and from the Divisions at the Central Farm. The regular issues of Seasonable Hints were also brought out. Below are listed the publications either issued from the Branch during the year or in process of being printed at the year's close:—

BULLETINS NEW SERIES

No. 11 New Varieties and Selections of Grain Originated on the Dominion Experimental Farms.

No. 15. Pigeons.

No. 17. Hardy Roses. Their Culture in Canada.

No. 18. Modern Orchard Practices.

No. 19. Cranberry Culture.

No. 21. Alkali Soils.

No. 22. Western Prairie Soils.

No. 23. Soil Fertility.

PAMPHLETS NEW SERIES

No. 10. Root and Storage Cellars.

No. 11. The Best Varieties of Grain.

No. 12. How to Caponize.

No. 17. Finishing Steers for Market.

No. 18. Winter Steer Feeding.

No. 19. The Winter Finishing of Steers (J. A. McClary).

No. 20. The Winter Finishing of Steers (W. W. Baird).

No. 21. The Winter Feeding of Beef Cattle in Ontario.

No. 22. Wintering Bees in Canada.

No. 23. Steer Feeding Experiments in P. E. I. 1921-22.

No. 26. In the Trough of the Wave.

No. 27. Meilleur Cheese.

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CIRCULARS NEW SERIES

No. 15. Diseases of Plums and Their Control.

SPECIAL CIRCULARS NEW SERIES

No. 9. Recommended Varieties of Field Roots.

EXHIBITION CIRCULARS

No. 106. Feeds for Wintering and Winter Fattening of Beef Cattle.

No. 107. Growing of Feeds for the Winter Feeding of Beef Cattle.

Following will be found some very brief notes on the work of each division and each branch Farm throughout the system:—

DIVISION OF ANIMAL HUSBANDRY

The breeding work with Clydesdales was continued in 1922; the results with foals, however, were not very good, owing to losses due to obscure causes. Only one case of joint ill occurred and the use of vaccine as a prophylactic treatment against this, combined with the use of potassium-iodide, is being continued. No experimental work with feeding horses was done, but figures relative to costs of rearing, maintenance and cost of horse labour were obtained.

In the fall of 1922, over 100 head of steers were purchased and run on range until snow fell. They were then divided into four groups, three of two-year olds and one of year-olds. One of the year-old lots is being finished to make an export shipment of cattle in May or June of 1923.

The dairy herd continued to show improvement. Four breeds are maintained, viz., Ayrshire, Holstein, Jersey and French Canadian. There are in all 176 head in the herd. The demand for well-bred bull calves was especially heavy during the year. A number of excellent Record of Performance and Record of Merit records were made and the general average of the herd well maintained.

With sheep, the Shropshire and Leicester flocks are making notable progress, owing to the excellent range facilities available during the year.

With swine, the herd totals 119 Yorkshires and 66 Berkshires. During the year fairly heavy sales in breeding stock and heavy sales of pork were made. Progress was made in the development of a distinctive bacon type with the Berkshires on the Central Farm.

In the dairy work, further improvements were made in the curing rooms of the dairy building, resulting in better control of moisture and temperature. The Meilleur cheese, recently originated at the Central Farm, has been greatly improved due to changes in process and curing. It has proven very popular with the public. An improved butter-milk cheese has also been brought out and is being regularly manufactured.

During the summer of 1922, further agricultural survey work was carried on in the Province of Quebec by a member of the Division.

A number of visits were made to branch Farms of the system and considerable work done judging at exhibitions, attending meetings, conventions, demonstrations, etc., and in assisting breeders and purchasers of stock, both from Canada and abroad.

DIVISION OF FIELD HUSBANDRY

The winter of 1921 and 1922, owing to low temperatures with little or no snowfall, was very hard upon clover and alfalfa, a considerable amount of winter-killing being experienced.

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On the Central Farm, in the regular hay mixture, alfalfa is included, which has been found very materially to increase the yield and also supply a leguminous hay mixture of greater permanency. Sweet clover in trials at Ottawa has proven very unsatisfactory, owing to smaller yield and poorer quality than the ordinary hay crop. It has also been found very difficult to cure.

An experiment with corn and sunflowers showed a slightly larger yield of dry matter per acre with corn and, from experiments so far conducted, it would appear unwise to substitute sunflowers for corn where the latter can be successfully grown.

The yields of crops at the Central Farm were: hay, 3 tons per acre; wheat, 27.4 bushels; barley, 56.7; oats, 70.5; mangels, 24.1 tons; Indian corn for ensilage, 15.9 tons per acre.

The experimental work conducted at Ottawa by the Division of Field Husbandry includes the study of various rotations and cultural processes. The widely varying types of soil on the Farm furnished results suitable for the use of the farmer cultivating a wide range of soils. Other lines of experiment are the maintaining of fertility of land which does not receive regular applications of manure, various rates and methods of applying farm manure, cost of production of field crops, etc., etc.

On the prairie Farms, some very interesting work has been incepted in the study of soil moisture, especially in those districts where precipitation is very scanty. These experiments comprise study of the amount of water required to produce the various farm crops, study of the drought resistance of these crops, conservation of soil moisture by cultural methods. In this branch Farm work, co-operation between the divisions at Ottawa and the branch Farm superintendents is very close, the final results of the work as recorded on the branch Farms being collated at headquarters at the Central Farm, Ottawa.

DIVISION OF HORTICULTURE

The work of this Division is of widespread interest, not only to the farmer and commercial fruit or vegetable grower, but also to those having small gardens or even only a bit of lawn with a few flowers or shrubs, as found in our cities, and it is the endeavour of the Division to meet the desires and needs of all these various classes as widely as possible, both in its experimental work and in its issuing of bulletins and pamphlets, handling of correspondence, holding of meetings, flower displays, etc., etc.

A main line of endeavour in this Division is the originating of new sorts of fruits, vegetable and ornamental plants suitable for Canadian conditions. The work of crossing and selection with this end in view has been in progress for many years and already marked results have been obtained. With the wider and more specialized work now being conducted, both at the Central Farm and on certain branch Farms, particularly devoted to horticultural work, more rapid progress is hoped for. Such sorts as have already been originated are compared with standard sorts and the most promising sent throughout Canada for further trial.

CEREAL DIVISION

The crop conditions in 1922 in most parts of Canada were almost the reverse of those of 1921. In eastern Ontario rain fell when most needed and crops were harvested under almost perfect conditions.

At the Central Farm the total number of test plots of cereals was 608, which included 586 varieties and also the nucleus of a collection of strains for a test of the various strains of the better known varieties of cereals.

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During the year the Division purchased a new plot threshing mill, which has been found to be a great improvement over the old one. A head threshing machine was also constructed from plans drawn in the Cereal Division and is giving good satisfaction for the threshing of single heads.

During the year a number of press articles were prepared, as well as a bulletin and a pamphlet by Dr. C. E. Saunders, late Dominion Cerealist. The annual free distribution of seed grain was conducted as usual, 15,676 samples being sent out in all.

DIVISION OF FORAGE PLANTS

The new Dominion Agrostologist, Dr. G. P. McRostie, took over his duties in July, 1922.

During the year the various phases of the work already established were continued and a considerable amount of new work introduced. Variety tests were carried on, comparing corn with sunflowers. A wide study was made of the suitability of various grasses and clovers for annual hay crops, both alone and in combination, and a number of selections made of desirable types of alfalfa, timothy, western rye grass, orchard grass and meadow fescue. Some of these have already proven so promising as to be named and a considerable number are being tested or multiplied upon the prairie Farms. Further isolations were made with sunflowers as well. With field roots, selection work was continued, with the idea of securing standard types and to eliminate the mixture of types found in most varieties now sold commercially.

POULTRY DIVISION

The marked interest shown during recent years in poultry keeping has been continued, and indeed increased, during the past twelve months. Upon the Experimental Farms themselves the work has progressed very satisfactorily. Flocks have now been placed upon the Farms at Swift Current and Beaverlodge and with a better class of poultrymen now available throughout the system, experimental work of a wider and more accurate nature is possible.

The chief feature of development in the year has been the registration of poultry through the medium of the series of egg-laying contests conducted by the Poultry Division throughout Canada. The qualifications for registration are, (1) that the bird be typical of the breed it represents, (2) that it have no standard disqualifications, and (3) that it lays 200 or more eggs, weighing 24 ounces to the dozen, within the contest year, 52 weeks. The registration is looked after by the Canadian National Poultry Record Association, the contests and inspection being handled by the Poultry Division of the Farms Branch and the registration by the Canadian National Live Stock Records. Only birds in the Canadian Egg Laying Contest can qualify.

Excellent progress has been made with the work of breeding high producing strains upon the Experimental Farm. This year a pen of ten pullets on the Agassiz Farm averaged 260.1 eggs per hen for the year.

The experimental work has been largely upon feeding problems and experiments in fertility and hatchability of eggs and liveability of chickens.

Through co-operation with the Health of Animals Branch, one of their officers was secured for the study of poultry diseases.

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The extension work is a very important feature of the activities of the Poultry Division. This work includes contests, exhibits, field work in the Province of Quebec and the Maritime Provinces and the sending out of poultry and eggs account forms to poultry keepers; also, the issuing of bulletins, press notices, and the giving of lectures.

DIVISION OF CHEMISTRY

The year's work in the Division of Chemistry was a very active one, not only in continuing lines of investigation already under way, but in planning and establishing new work. Under the former head a great volume of work which may be generally defined as chemical service to farmers was carried on, covering analyses of samples of soils, manures and fertilizing materials, fodders, feeding stuffs and forage plants, well waters and miscellaneous samples sent in from all parts of Canada. A great amount of work was also done for the Meat and Canned Foods Division of the Health of Animals Branch, some 2,792 samples being analysed and reported upon.

The division is also carrying on the study of many soil problems, of which two may be mentioned, viz., the influence of certain croppings and rotations on soil fertility and the alkali content of soils as affecting their agricultural value under irrigation.

The investigational work in fertilizers was carried on on a number of the branch Farms and upon the Central Farm, and a number of new experiments in this connection have been planned for 1923. A large number of special investigations were continued during the year, such as the determination of fat and protein content of flax seed and the study of the nutritive value of some well known varieties of corn, the problem of the stage of growth at which to cut sun-flowers for ensiling, and the advisability of growing sweet clover for silage use.

The Division has also taken on the work of standardizing feeds. Last year's work included the revision of standards for wheat, and in 1922 the classifying of meat and fish products was undertaken. The usual analysis of the sugar content of sugar beets grown in various parts of Canada was made.

DIVISION OF BOTANY

The work of the Division of Botany falls under the two heads of economic botany and plant pathology. Some of the main lines of investigation carried on related to weed eradication and control, study of plants poisonous to live stock and diseases affecting crops. The plant pathological work is conducted not only at Ottawa but at a number of points where field plant pathological laboratories have been established, these being situated at Charlottetown, Fredericton, St. Catharines, Winnipeg, Indian Head, Saskatoon and Summerland. All these act not only as laboratories for research but as centres from which information is spread to the farming community served by each. At the Central Laboratory at Ottawa, research work was conducted in the study of the action of light on plants, forest pathological problems, the physiological action of fungi, etc.

Special attention is paid to the potato crop of Canada and its diseases, a widespread and thoroughly organized system of inspection and certification of the fields and harvested crops being carried on.

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DIVISION OF ECONOMIC FIBRE PRODUCTION

The season of 1922 was an excellent one, although the retting season was not favourable in some districts. Ten and a half acres of fibre flax were sown by this division, one-fifth of the area being used for variety tests and the remainder for experimental work in flax growing and growing it commercially. Of the eight varieties tested, Ottawa 770B gave the highest dry weight per acre 5,900 pounds. The yield from the commercial acreage was a little lower than that of the experimental plots.

Experiments were carried on to determine the best stage of growth for harvesting flax for fibre, the crop being pulled at different dates but the same variety being used throughout the experiment. From results so far there seems to be very little difference between early- and late-pulled flax, that is, when the whole period does not extend over two weeks. This work will, however, be continued. The yield of fibre from dew and water-retting was also studied, but the experiment is yet being continued. Careful records were kept during the year as to the actual percentage of long fibre and tow obtained from flax straw and the losses due to each operation. It was found that the percentage of long fibre represented 8.20 of the original weight and of tow 4.46 per cent of the original weight.

Two varieties of hemp were also tested, but the season at Ottawa proved too brief to allow them to mature, although both were harvested and scutched. Varieties of fibre flax are being tested at eight branch Farms in the eastern provinces.

Commercial flax growing and manipulation were carried on at Clinton, Ont., where some 160 acres were sown to fibre flax and a flax mill was leased to handle the crop. Some very valuable practical results and figures were obtained. In tests of new machinery, the Van Allen deseeder was tried out with satisfactory results. The Vessot lifting machine was also tried, but it was found that it still requires some perfecting before it is in shape to manufacture commercially.

The Chief of the Division visited Europe in the spring of 1922 to look into the question of markets for flax products, and the results of this trip are not yet fully known. Considerable interest was aroused in the fall among American buyers who examined the western Ontario flax crop and so far some 400 tons have been disposed of to American spinners. To aid in the work of getting the crop in shape for selling at the best price, a competent flax grader is employed by the Flax Division to visit the scutching mills and supervise the work of grading thereat.

THE TOBACCO DIVISION

The season of 1922 was not so favourable for tobacco growing, either in Ontario or Quebec, as was the preceding year and the area planted in Quebec Province was much smaller. The quality of crop from both provinces was satisfactory.

Heavy rainfall at the Tobacco Experimental Station, Farnham, Que., at times completely flooded the plantations and interfered materially with some lines of the experimental work. At Harrow an interesting line of work was the trying of a special furnace for the curing of yellow tobacco by the hot-air process. The results have established clearly that the apparatus is not satisfactory for the purpose, under the climatic conditions prevailing in the Counties of Kent and Essex. The possibilities of using high pressure steam for heating the kilns was also tried, a locomotive type boiler being installed with a large number of independent groups of radiators, permitting of an exact regulation of temperature. This system worked very satisfactorily.

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The most progress made in 1922 was perhaps in the growing and handling of certain aromatic tobaccos suitable for cigar manufacturing and it is hoped that another year or two of trial and development of these types may result in fixing a variety or strain which will produce a tobacco acceptable to Canadian cigar manufacturers.

BEE DIVISION

The bees came out in the spring of 1922 in good condition and there was an abundance of early pollen and nectar. In some parts of Canada, however, later conditions were not favourable for honey gathering, although in other parts, remarkably heavy crops were obtained. The average yield per colony at the branch Farm, Agassiz, B.C., was 194 pounds, and at Morden, Man., 272.6 pounds. During the year two new apiaries were started, one at Beaverlodge, Alta., and the other at La Ferme, Que., while the Central Apiary at Ottawa increased from 63 to 100 colonies.

Bee breeding experiments were continued and also experiments in the control of swarming by manipulation. Comparison of wintering bees outside in packing cases versus cellar wintering was also continued, both at Ottawa and at some of the more northern Experimental Stations.

Many samples of diseased brood and adult bees were received and diagnosed for private beekeepers throughout the year.

DIVISION OF ILLUSTRATION STATIONS

Eighty-nine Illustration Stations were operated during the year, these being located as follows: 11 in British Columbia, 11 in Alberta, 15 in Saskatchewan, 31 in Quebec, 10 in New Brunswick and 11 in Nova Scotia. It is hoped to increase the number of these and establish some in new districts in 1923.

The Illustration Stations have done good work in the introduction of new crops in certain districts of the eastern provinces, such as the growing of succulent crops for winter feeds.

At thirteen points in Alberta and Saskatchewan where Illustration Stations are located, sufficient corn and sunflowers were grown to warrant the use of a silo. Trench silos were excavated at 11 of the Stations and at two others crib and scantling silos were put up. This work has created a great deal of interest and has furnished some very valuable data. The trench silos proved very satisfactory, both as to the quality of silage and the ease of handling same.

In the Maritime Provinces the value and use of certified potatoes for seed as compared with uncertified stock were demonstrated.

An interesting and valuable feature of the work of the Illustration Stations is their serving more and more each year as centres for the distribution of tested varieties of seed grain, grasses and clovers. The farmers in the districts where these Stations are located are looking more and more to the Illustration Stations for their supply of first-class seed.

DIVISION OF EXTENSION AND PUBLICITY

The work of this Division was continued along the lines of the preparation of exhibits for various fall fairs, the distribution of literature at exhibitions and circulars, the planning and construction of educational exhibits and the arranging of exhibits for various fall fairs, the distribution of literature at exhibitions and fairs, and the securing of additional names for the mailing lists, etc.

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A very interesting feature of the work of this Division is the lantern slide bureau, which is rapidly growing and becoming in increased demand. These slides are arranged in series to illustrate various agricultural subjects and with each is sent out a brief synopsis or series of notes on the topic illustrated.

For the first time a complete exhibit was staged at the Canadian National Exhibition, Toronto, and attracted a great deal of attention. A special exhibit was also made at the Central Canada Exhibition and at the Royal Winter Fair, Toronto. The Chief of the Division addressed some fifteen meetings during the year and acted as judge at a number of horticultural and agricultural fairs.

EXPERIMENTAL STATION, CHARLOTTETOWN, P. E. I.

Spring opened late and it was the middle of May before cereals were sown. The growing season, however, was favourable and the harvest excellent.

During the year, the Blake property of fifty-one acres in all was added to this Station.

The Ayrshire herd, which did excellently during the year, was fully accredited in August, 1922. Steer feeding has been conducted during the past winter, the main points under observation being variations in the rations fed, and the effects of dehorning steers.

With swine, a bacon production test was carried on in co-operation with five of the Prince Edward Island breeders of pure bred hogs and the Live Stock Branch.

There were twenty pens in the fourth Prince Edward Island Egg Laying Contest which closed at the end of October, eleven birds qualifying for registration by laying over two hundred eggs in the year.

A number of breeders' and growers' associations held Field Days at the Station, and the Superintendent and his Assistant gave instruction at several Short Courses and addressed farmers' meetings.

EXPERIMENTAL STATION, KENTVILLE, N. S.

The fruit orchards established on the Station in 1912 are now coming into bearing, the 1922 crop amounting to 1,048 barrels. This fruit was shipped to the British market through a farmers' co-operative organization, but the returns were low last year, averaging only \$1.87 per barrel.

A great deal of experimental work is being conducted in the use of both liquid and dust insecticides and fungicides upon the orchards.

Fertilizer experimental work is also being given special attention both in connection with fruit and field crops. The value of ground limestone as a soil improver is being very clearly brought out in this work, the yield of clover having, in many cases, been doubled thereby.

The dual-purpose herd of Shorthorns is gradually improving from the use of bulls from good milk-producing strains, while at the same time retaining its beef quality.

The poultry flock and equipment were enlarged during the year, and special attention was given to the apiary, not only with a view of greater honey production, but to permit of a wider study as to the effect of keeping bees in fruit-producing districts.

EXPERIMENTAL FARM, NAPPAN, N.S.

Farming operations were under way by the 15th of May and the growing season was an excellent one, resulting in heavy yields of field crops.

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Guernseys, Shorthorns, grade Ayrshires, and grade Holsteins are kept at the Nappan Farm, and some valuable data as to cost of milk production, cost of rearing young stock, and cost of feeding a mature herd were obtained.

Experimental work with swine covered the accumulation of data on the cost of maintaining brood sows, cost of feeding small pigs, cost of pork production, and the values of different rations.

With sheep, the work covered the cost of maintaining both a pure-bred and a grade flock, cost of rearing lambs, and grading-up experimental work.

Under field husbandry, rotations, cost of production, and comparison of values of different cultural methods were studied. Experimental work was begun on marsh land to obtain data as to cost of improvement. Variety test work was carried on in cereals, forage crops and in horticulture.

The third Egg-Laying Contest for Nova Scotia was held at the Farm during 1921-22, including two hundred birds. With the Farm flock, a wide range of experimental work is being conducted in the study of the cost of egg production, various rations for growing and laying stock, incubation, brooding, housing, etc., etc.

During the year, the Superintendent addressed a number of meetings and acted as judge at several fairs.

EXPERIMENTAL STATION, FREDERICTON, N.B.

The winter of 1921-22 was very mild and the first ploughing was done on April 17; later unfavourable weather, however, delayed seeding about a month. Excellent crops resulted from a favourable growing season.

Holsteins, Ayrshires and dual-purpose Shorthorns are kept at the Fredericton Station and during the year eleven cows were entered in R.O.P.

With sheep, the Shropshires and Cheviots are kept. Some of the work done with these was the determining of the value of early versus late weaning of lambs, also whether the late marketing of lambs was profitable.

With swine, the Yorkshires are kept, but present accommodations do not permit of a sufficient herd to meet the demand for breeding stock. Experimental work in feeding for bacon production was conducted.

Extensive pedigree work is being carried on with poultry, which is confined to the Barred Plymouth Rock breed at this Station. Also the rearing of chickens and feeding for egg production are being studied. The second annual provincial Egg-laying Contest was conducted at the Station during the year.

In field husbandry, general field crops were grown and plans determined upon for the study of the best system of rotation of crops for the province of New Brunswick.

With forage crops, the first year's work with alfalfa was very satisfactory, there being no winter killing, and the work with clovers and grasses for hay production is furnishing some very interesting data.

The superintendent of the Fredericton Station is also in general charge of the Illustration Station work in New Brunswick, eight new stations being established during the year, bringing the total number up to seventeen.

A number of small excursions were held at the Station during the summer, and exhibits were shown at several fall fairs.

EXPERIMENTAL STATION, STE ANNE DE LA POCATIERE, QUE.

The season in this district was rather an unfavourable one, owing to prolonged drought, which lasted from the latter part of June practically until winter set in. Grain crops were fair but other crops and pastures were very poor.

The pure-bred Percherons kept at the Experimental Station did well during the year, three good colts being raised. Much improvement has been made in

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the herd of Ayrshires through the elimination of low-producing individuals. Sheep, swine and poultry did well during the year although not a great deal of experimental work was carried on, owing to the reorganization under way at the Station. The first Eastern Quebec Egg Laying Contest was started on November 10, 1922.

In field husbandry, three, four and five-year rotations are now under way, as well as a number of experiments in soil management.

The usual variety tests were conducted with cereals, forage crops and in horticulture and some selection work done with field roots.

An exhibit was shown at eight fall fairs in the district and a considerable amount of judging done.

During the year, a fruit cellar, a small cottage, a house for the Superintendent and a poultry contest house were built.

EXPERIMENTAL STATION, LENNOXVILLE, QUE.

The season was later than usual, seeding commencing on May 1. Yields of all field crops were very good.

The herd of cattle is made up of pure-bred Ayrshires, Shorthorns and Jerseys, the last-named having been just recently added. In addition, feeding experiments were conducted with some ninety-two steers. The Yorkshire breed of swine is kept and the Oxford Down breed of sheep. There was considerable demand for breeding stock of each of these.

During the year the area set apart for experimental work with fertilizers was divided into plots and the work commenced. Variety tests were carried on with forage crops, cereals and in horticulture, the latter comprising fruits, vegetables and ornamental gardening.

The first poultry contest at this Station was commenced on November 1, with twenty pens. Some excellent work in breeding and selection is being done with the farm flock and a high producing strain is gradually being established.

A number of improvements were made on the Farm buildings and a new laying contest house erected. Three hundred and sixty rods of fence were put up and some thirteen acres of rough land cleared and levelled. The Farm exhibit was shown at several points. The annual farmer's day was held at the Experimental Station on August 16 with one of the largest gatherings ever seen on such an occasion.

EXPERIMENTAL STATION, CAP ROUGE, QUE.

At this Station most field and garden crops ranged from excellent to good in yield but pastures, roots, small fruits and potatoes were only fair.

At the end of the fiscal year there were eighty-seven pure-bred French-Canadian horses at the Station or at the Horse Farm at St. Joachim. These animals are being used for experiments in breeding and housing besides doing the work on the Farm. The number of foals raised in 1922 was twenty-two.

With cattle, seventy-two pure-bred French-Canadians make up the herd, with which experiments were conducted in breeding, feeding, housing and management. This herd has more families qualified in Record of Performance than any other herd of the breed in existence. During the last two years the world's record for two-year olds of this breed was broken three times by heifers bred at Cap Rouge.

Some excellent work in breeding, feeding, housing and management of poultry was conducted during the year, the Barred Plymouth Rocks being the breed kept.

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The work in field husbandry comprises, generally speaking, cost of production of the main field crops, comparison of rotations, comparison of corn, sunflowers, peas and oats for silage and work in soil management. With cereals, forage crops and in horticulture the regular variety test work was continued and some selection work was done with the first-named. During the year a foaling shed was put up at the Horse Farm and the cattle barn at Cap Rouge was finished.

EXPERIMENTAL STATION, LA FERME, QUE.

The season of 1922 in the Abitibi region was not as favourable as that of the preceding year, which had 101 days without frost as against 85 days in 1922. There was, however, abundant rainfall and a good harvesting season.

No experimental work with horses has yet been commenced at this comparatively new Station but a commencement has been made in establishing a herd of Ayrshires, both pure-bred and grade, and some experimental work with sheep and with swine was carried on.

In field husbandry, several rotations were established in 1922, principally to study the best methods of maintaining soil fertility. Further clearing work was carried on, the total area of the Farm, under cultivation, now being 200 acres and clearing work will be continued during the coming year.

Tests of varieties of cereals and forage plants and garden crops are well under way. A flock of poultry has been established and work with bees commenced. In the course of the year two poultry houses were constructed and a piggery partly built. Part of the barn was fitted up for the cow barn and repairs made to a number of the buildings.

An exhibit was shown at the local fair at Amos.

EXPERIMENTAL STATION, KAPUSKASING, ONT.

The precipitation during the five growing months of 1922 was 3.65 inches below average. This, with a late spring, caused poor germination and slow growth, with reduced yields.

The dairy herd at this Station consists of grade Ayrshires, with a pure-bred Ayrshire bull and the beef herd is of grade Shorthorns, headed by a pure-bred Shorthorn bull. The whole herd is accredited. With sheep, the Shropshire breed is kept and the Yorkshire breed of swine. With horses, no experimental or breeding work has yet been attempted, only work animals being so far kept on the Station.

Considerable experimental work with ensilage crops was carried on as to the best mixtures, rates of seeding, crops best suited for this purpose, etc. Work with crop rotations was laid out, as well as experiments in building up new land by the use of green manures. This Station affords an excellent opportunity of getting cost data as to various methods of clearing land. These data are being carefully kept. In horticulture, variety test work was carried on with small fruits and vegetables. The orchard set out in 1918 has not yet come into bearing. Tests with varieties of cereals and forage crops were also carried on.

In co-operation with the Division of Chemistry some extensive experiments are under way in the test of fertilizers, etc.

The poultry plant has now reached a good size and some excellent work was done in the comparison of various rations for laying stock and in fattening experiments.

A small apiary has also been established.

EXPERIMENTAL STATION, MORDEN, MAN.

Yields of all field crops in Southern Manitoba were considerably above average in 1922.

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During the year the small herd of Ayrshires kept at the Morden Station was increased by four cows and a young bull. Some good milk records are being made at the Station.

Horticulture is made a main feature at the Morden Station and excellent progress is being made in the work, both with fruits and vegetables. The main object in view with fruits is to secure varieties hardy enough for general use in the Prairie Provinces and during the year a plant breeding greenhouse was erected to facilitate this work.

The work with poultry and bees is now well established. Pedigree work is being continued with poultry and the apiary is gradually being enlarged. It is believed that there is a considerable future for bee keeping in this section of Manitoba.

EXPERIMENTAL FARM, BRANDON, MAN.

Owing to an over flow of the Assiniboine river, about 200 acres of the Experimental Farm at Brandon were flooded and 170 acres were without crop for the season. On the remainder of the Farm, however, conditions were favourable and excellent crops were harvested.

The herd of dual purpose Shorthorn cattle at Brandon, numbering about 70 head in all, are showing steady improvement through selection. Careful cost of production figures are kept and a wide range of experimental work, especially in feeding, is carried on. Steer-feeding experiments were also conducted during the year.

A trench silo was dug on the Farm this year and filled with corn ensilage. The silo proved a complete success, there being scarcely any loss from decay and none from frost.

With the Yorkshire swine, the breeding operations carried on have been with the object of producing a type which will conform to export bacon requirements. In addition to this, feeding experiments have been conducted and cost of production figures gathered.

With sheep, the main work carried on is grading up experiments and, in horses, Clydesdale breeding, some very fine individuals being in the stud.

In field husbandry, work with crop rotations takes up a large area of the Farm and forms a very important part of the work. This, however, was greatly hampered for the year by the flood referred to.

Cultural experiments are also an outstanding feature, these covering depth of ploughing, depth of seeding, stubble treatment, summer-fallow substitutes, cultural methods of controlling rust, etc., and this work was extended last year to cover experimental work in the growing of hay crops.

The variety tests with cereals, forage crops, vegetables, fruits, etc., were conducted as usual and some important data gathered.

With poultry, the breeding work is with the end in view of developing good utility strains of Barred Rocks and White Wyandottes. The Manitoba Egg Laying Contest is also conducted at the Brandon Farm.

EXPERIMENTAL FARM, INDIAN HEAD, SASK.

The crop yields of 1922 were considerably above average, the field lots of wheat yielding as high as 48 bushels per acre. Very little rust damage was noticeable and insects pests were not as numerous as usual.

The horses on the Farm are now practically all pure-bred Clydesdales. Careful feed records were kept during the year and the treatment for the prevention of diseases in foals was found to be ninety per cent effective.

The cattle on the Farm are all pure-bred Shorthorns of the dual-purpose type. Comparison of feeding of Indian corn vs. sunflower silage to this herd

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was carried on with a slight advantage shown in favour of the former. Experiments were also carried on with sheep and swine. The work with poultry included feeding, incubation and brooding experimental work, together with a continuation of the efforts to produce a high egg laying strain of White Wyandottes. The Saskatchewan laying contest is carried on at this Farm.

Variety tests were carried on with cereals, forage plants, fruits and vegetables, as usual.

A number of new cultural experiments were started during the year, including methods of summer-fallow, summer-fallow substitutes and of fertilizers, stubble treatment, rates of seeding grasses and clovers, etc., etc.

A large number of visitors came to the Farm during the year, although no special excursion days were held.

EXPERIMENTAL STATION, ROSTHERN, SASK.

Freedom from frost and sufficient moisture made the season of 1922 a successful one. The hay crop was the largest since 1914 and the grain crop since 1916.

A notable feature of the work at this Station is the herd of Holsteins, made up of 22 females, all developed on the Station from two heifer calves purchased in 1914. The records made by some of these are outstanding. During the winter of 1921-22 steer feeding experiments were carried on to compare various rations for this purpose.

The work with sheep consists of the grading up of range ewes by the use of a well-bred Leicester ram. Excellent results are being obtained from this work. With swine, the Berkshires and Tamworths are being compared as to cost of rearing and feeding and quality of pork.

The work in field husbandry has, so far, been confined almost entirely to rotation of crops. This has been carried on continuously since 1911, with a number of excellent results therefrom.

Another interesting feature of the work here is that in horticulture. For some years after the establishing of the Station, little progress could be made, owing to climatic conditions, but as soon as the windbreaks became established there was much less difficulty in growing vegetables, flowers and some of the more tender shrubs. With cereals and forage plants the usual variety testing work was carried on during the year, a special feature of the latter being comparison of corn with sunflowers and ensilage.

The work with poultry showed especially good progress, both feeding experiments and breeding work being conducted.

An exhibit prepared at the Station was displayed at several fairs and the Superintendent addressed a large number of conventions, farmers' meetings and classes in agriculture for boys.

EXPERIMENTAL STATION, SCOTT, SASK.

While there was ample moisture early in the spring in this district, from the middle of May to the end of July, rainfall was very scant and, consequently, cultivated grasses and early sown cereals suffered.

The Percheron breed of horses is kept at this Station and two pure-bred foals were raised during the year. There are at the Station now twenty-five head of pure-bred dual-purpose Shorthorns, which did well in milk production. A comparison of various feeds was carried on during the winter months and cross breeding experiments with swine were continued. With sheep consider-

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able work was done towards ascertaining a reliable preventive for goitre in lambs. It was found that feeding a small quantity of potassium iodide solution in the salt was quite successful. Cross-breeding work with sheep was continued.

Variety tests were carried on with cereals as well as with vegetables.

Work was carried on with poultry in feeding experiments and comparison of pullets vs. year-old hens as layers, the advantage going to the former.

An exhibit from the Station was sent out to six fairs.

EXPERIMENTAL STATION, SWIFT CURRENT, SASK.

In 1922 the first crop was produced and the first experimental work done on the Swift Current Station. In general the season was a very favourable one and good crops of all kinds were obtained. Seeding was almost a month later than the average in this district and was further delayed by bad weather after its commencement. It was finished about the end of May.

Extensive experiments in field husbandry have been laid out, both in fields and in plots. There are three main problems being studied in the field work: (1) summer-fallow methods, (2) methods of treating stubble land for grain crops, (3) crop rotations. In addition, the usefulness of various packers, cultivators and other implements is being carefully observed. A seven-year rotation has been laid out on a fifty-acre field, and, adjoining, other rotations, suitable for dry land farming, have been laid down.

An area of twenty-five acres has been laid out in one-fortieth acre plots, on which will be conducted experiments on the cultivation of corn, sunflowers, hay and pasture grasses, methods of seeding grass and clover, fallow substitutes, fall rye culture, and a number of rotations. Variety tests of cereals and of forage crops have also been put under way.

In animal husbandry, a small herd of Shorthorn cattle has been established. No breeding work with horses has yet been commenced, but when started the breed used will probably be the Clydesdale. A start was made with poultry by the purchase of a small flock of Rhode Island Reds.

In horticulture, the first work done was the planting of material for hedges and windbreaks without which horticultural work is difficult.

During the summer there were erected on the Station a superintendent's house and office, a boarding house, a straw barn for cattle and a number of grain bins.

EXPERIMENTAL STATION, LETHBRIDGE, ALTA.

The season of 1922 was unusually late, most seeding being done after May 15. The weather was favourable until the middle of June, but from that date until harvest the rainfall was insufficient. However, crop conditions generally throughout southern Alberta were better than in any year since 1916. There was little soil drifting but cutworms did damage in some localities. Grasshoppers were successfully combatted by co-operation among the farmers aided by the Provincial Government.

The horses on the Station are all grades with the exception of one team of pure-bred Clyde mares and two teams of pure-bred Percheron mares. No special experimental work in breeding has been attempted. Experimental work with steer feeding was carried on during the winter 1922-23 to compare the feeding value of alfalfa hay with sunflower and with corn silage. Feeding work was also conducted with lambs. An interesting experiment at this Station is the study of the feasibility of farmers on irrigated land using forest reserve pasture for their sheep during the four summer months. The results so far are inconclusive, but would seem to point towards the advantage of a number of farmers co-operating in this work, so that the combined flocks might be large enough to warrant the employment of one or two herders.

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A great deal of interest was shown in the poultry work at this Station. The Provincial Egg Laying contest for Alberta is carried on here. The work with bees again proved to be satisfactory, showing the suitability of southern Alberta for bee keeping. A number of farmers are keeping a few colonies of bees and some fair-sized commercial apiaries have been started.

In field husbandry, eight different rotations of crops are under test on the dry land and three on the irrigated land of the Station. The usual variety tests with cereals and forage crops were conducted as well as with certain vegetables and small fruits. It was found possible to expand the investigational work in irrigation to a considerable extent during the past season, a large number of plots having been laid out and study made of the effect of applying water at different stages of development of plants, the special crops dealt with being alfalfa, timothy, pasture grasses, wheat, potatoes and sunflowers. An exhibit was sent out to a number of local fairs in the district and a special exhibit was prepared for the Calgary Horticultural Association.

EXPERIMENTAL STATION, LACOMBE, ALTA.

The season of 1922 was an abnormal one. It was the driest year on record at this Station and was the fourth in a series of dry years, while severe frosts on May 23 and June 7 with a hail storm on June 19 gave all crops an additional setback. As a result, hay crops were an absolute failure, pastures were bare, and early seeded crops gave very light yields, but late seeded crops and late varieties yielded well.

The live stock at the Station consists of three pure-bred Hackney and twelve Clydesdale horses, seven of which are pure-bred females.

In the beef herd, there are seventy-five head, of which seventy-two are pure-bred Aberdeen Angus. The dairy herd is made up of forty-seven pure-bred Holsteins and twenty-one Holstein grades. Experiments during the year were confined to cost of production and cost of raising young stock, while, with dairy cattle, milk production and its costs were featured.

With sheep, the grading-up experiment with range ewes was continued.

With swine, breed comparisons were carried on with Yorkshires, Berkshires, Duroc-Jerseys, and their various crosses. It has been found that Yorkshires make more economical gains than either of the other two breeds and have produced a much higher percentage of select bacon hogs.

In field husbandry, the most outstanding line of work is the cultural experiments started in 1911; especially during the last four years most valuable data have been secured as to the value of the various cultural treatments in very dry seasons.

In horticulture, the season was very dry and hot for fruits and vegetables, although some good yields of the latter were secured.

Owing to abnormal weather conditions, results of tests with cereals were quite unusual, being decidedly in favour of late varieties. With forage crops, it was noted that corn stood the hot dry weather much better than sunflowers or oats for green feed.

With poultry, White Wyandottes, Barred Rocks, and Single Comb Rhode Island Reds were compared for egg production. Geese and ducks are also being kept.

Interest in beekeeping is increasing throughout the district and the apiary at the Station was increased to thirteen colonies, one of these producing 159 pounds of extracted honey.

During the year the horse barn was moved and the interior rearranged, the implement shed moved and repaired, a number of buildings painted and considerable water piping laid.

An exhibit was shown at seven fairs in the province and a carload exhibit of three breeds of swine was shown at Edmonton, Calgary, and Red Deer.

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EXPERIMENTAL STATION, SUMMERLAND, B.C.

The spring of 1922 was very late, after one of the longest and coldest winters recorded in the Okanagan district. June, July, and August were very dry with the exception of two good rains in the latter month. The fall of 1922, however, has given abundant moisture.

In animal husbandry, no dairy herd has been established at this Station as yet, owing to lack of suitable buildings, but experimental work was carried on in steer feeding, and work in breeding Berkshire swine, also Cheviot and Suffolk pure-bred sheep and grade Oxfords was continued.

The work in field husbandry is being carried on in a seven-year rotation, with alfalfa as the hay crop.

The main feature at this Station is the work with horticulture. The orchards came through the winter of 1921-22 in good condition with little or no indication of winter injury. Different systems of orchard management are being carried on and the orchards so treated are now reaching a stage when it is possible to make a preliminary survey of the results of each method followed. Experimental work was also continued with vegetables, especially to obtain data as to the amount of irrigation water required for each.

With cereals and forage plants, tests of varieties were continued and some selections made.

With poultry, trap nesting and pedigree work is conducted with White Wyandottes. The result of this work is already being seen. In the season of 1918-19, the percentage of birds laying two hundred eggs or over was 7.5; in the season of 1921-22, this percentage was brought up to 34.6.

An increase in the number of colonies was made in the apiary. The season was a good one for honey production, the heaviest yield from one colony on the Station being 240 pounds.

The Station took charge of the Farms Exhibit at Vancouver and New Westminster, and also showed at four other points in the province.

EXPERIMENTAL STATION, INVERMERE, B.C.

The soil was very dry in 1922 and rainfall up to the end of September was almost three inches below the average of the past nine years, which goes to show how dependent the Invermere district is on irrigation. In field husbandry, a new series of rotations was started during the year to include studies in the upkeep of soil fertility, adaptability to the farming practices of the district, and to incorporate cash crops in the rotation. A three and a four and two six-year rotations under irrigation are now being conducted. The variety tests with cereals and forage crops were continued and also variety and cultural tests with a large number of vegetables, special attention being given to work with potatoes, including variety testing, breeding and selection, cultural methods, and soil fumigation for the prevention of diseases.

Special attention is given to poultry work on this Station, pedigree trap nesting being followed. An interesting note in this work was the performance of the hen Lady Dot E3, which in 1921 laid 325 eggs in her pullet year; she followed this up in 1922 by laying 224 eggs in her second year, and a number of chickens were hatched from these eggs from which it is hoped to establish a high laying strain.

The work with bees was continued but the season was not a very good one for honey production. Considerable building work was done during the year and some land cleared which will be put into orchard in 1923. An exhibit from the Station was shown at six local fall fairs.

EXPERIMENTAL FARM, AGASSIZ, B.C.

The spring of 1922 was the latest on record owing to the severe winter and continued spring rains until the middle of May. The summer was hot and very dry, so that crop yields were below normal.

The Clydesdale horses kept at the Farm made an excellent showing at New Westminster and at the Pacific International Live Stock Exposition held at Portland. The dairy herd consists of sixty-four head of pure-bred Holsteins and are under the accredited system. A notable feature is the record made during the year by the cow Agassiz Segis May Echo 41302, which produced 30,866 pounds of milk and 1,681.25 pounds of butter in 365 days, this being the world's record for butter production for all breeds and all ages.

Approximately, one hundred breeding sheep, mostly Dorsets, are kept. A number of these were shown at various exhibitions. Swine of the Yorkshire breed were also shown and did well. There is a strong demand for breeding stock from this Farm.

Poultry work at this Station is remarkably good, Barred Plymouth Rocks and White Leghorns being kept. Some excellent records were made and the Egg Laying Contest of British Columbia is conducted at this Station. A pen of Barred Plymouth Rocks owned by the Farm won the contest in 1922, the ten pullets in the pen laying 2601 eggs in the year.

An excellent honey crop was harvested from the small apiary kept.

Test of variety work was carried on with cereals and forage plants, special attention in the latter case being given to the comparison of corn and sun-flowers for ensilage purposes. The dry summer caused low yields in most garden crops, but apples and cherries yielded well.

EXPERIMENTAL STATION, SIDNEY, B.C.

The winter of 1921-22 was unusually severe and the spring backward, going to confirm previous observations that the fall sowing of crops in this district should be pursued as far as possible. Special experimental work along this line is being carried on. The main feature at the Sidney Station is horticulture, consequently, not much work is being done with live stock, but a small herd of pure-bred Jerseys is kept and a small flock of Southdown sheep.

The high cost of land and the special farming methods necessary on the Island make the regular farm rotations unprofitable so that no rotation work as compared with that on the other Farms and Stations has been laid out. It is clear that the small holding and intensive farming are the only methods of carrying on profitable agriculture on the Island.

In horticulture, very special attention has been given to the orchards and bush fruits, both as to cultural methods, testing of varieties, selection work, etc.,

The poultry work at this Station is very outstanding. White Wyandottes are the breed kept and the average production for the Station flock in 1922 was nearly two hundred eggs per bird.

During the season, a combined shed and root house was built. A large number of visitors came to the Station, and the work would appear to be attracting more and more attention from the farmers and fruit growers of the Island as well as from the city dwellers desirous of obtaining information as to the handling of ornamental plantations, lawns, and flowers.

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EXPERIMENTAL SUB-STATIONS

Work was continued as in former years on the Experimental Sub-Stations at Fort Vermilion, in the Peace River district, Beaverlodge, in the Grande Prairie district, and a certain amount of experimental work, especially with tree fruits, was also done at Salmon Arm, B. C. A new Sub-Station was commenced at Betsiamites, Saguenay County, Quebec. The work done during the year was of a preparatory nature.

DAIRY AND COLD STORAGE BRANCH

GENERAL

Owing to shortage of fodder during the winter of 1921-22 dairy cattle came out in poor condition in the spring of 1922, with the result that production during the early weeks of the season was abnormally low in many districts. Climatic conditions were favourable and the total year's production will exceed that of the previous year.

The price of creamery butter, while averaging somewhat lower than during 1921, was quite uniform and without marked fluctuations throughout the season. The cheese market on the other hand was quite erratic, opening early in May at about twelve cents per pound and reaching in November about twenty-four cents per pound. The extremely low price of cheese during the early weeks of the cheese producing season and the fact that the price of butter was, during a great part of the season, relatively higher than that of cheese, caused considerable diversion from cheese production to butter production. Production statistics for the year 1922 are not yet available but receipts at Montreal from May 1, 1922, to March 31, 1923, show an increase of 156,455 packages of butter and a decrease of 332,359 packages of cheese as compared with the receipts between May 1, 1921, and March 31, 1922.

Exports of butter between April 1, 1922, and March 31, 1923, amounted to 21,994,588 pounds, which is more than two and one-half times the quantity exported during the previous year. The greater part of the increase was in exports to the United Kingdom, although exports to the United States also showed a decided increase. Between April 1, 1922, and January 31, 1923, exports of cheese showed a decline of 12,050,400 pounds as compared with the same period of 1921-22. Imports of butter into Canada between April 1, 1922, and January 31, 1923, show a decrease of 33 per cent as compared with the same period of 1921-22, and the reduction in imports during the last two months of the current fiscal year will show an even greater decrease as compared with the same two months of the previous year.

Production of condensed and evaporated milk will show a decrease as compared with the previous year and exports of these commodities during the ten months ending January, 1923, show a decline of 26 per cent as compared with the same ten months of the previous year.

Production of milk powder, however, was greater than in the previous year and the increase in exports for the ten months ending January, 1923, showed an increase of 361 per cent over the exports of the same ten months of the previous year.

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As mentioned above, production statistics for the year 1922 are not yet available, but the following table shows quantities and values of different products during 1921:—

TOTAL DAIRY PRODUCTION IN CANADA IN 1921

Cheese.....	lbs.	162,117,494	\$28,710,030
Creamery butter.....	"	128,744,610	48,135,439
Dairy butter.....	"	125,000,000	37,500,000
Whey butter.....	"	1,337,404	431,114
Condensed milk.....	"	38,997,936	5,837,787
Condensed skim-milk.....	"	1,307,781	51,788
Evaporated milk.....	"	31,202,713	3,428,456
Condensed coffee and cocoa.....	"	324,011	94,065
Milk powder.....	"	1,703,496	554,918
Skim-milk powder.....	"	5,749,229	830,585
Sterilised milk.....	"	6,696,264	719,009
Casein.....	"	98,136	9,814
Ice cream.....	Gals.	5,786,702	8,287,000
Cream sold by dairy factories, lbs. butter fat.....		8,051,215	5,734,638
Buttermilk sold.....			300,278
Milk for direct consumption.....			72,000,000
Curd, cheese, whey, whey cream, skim-milk.....			271,429
			<hr/> \$212,896,350 <hr/>

As compared with production during 1920, condensed milk was the only commodity showing a serious reduction, while cheese and butter showed a decided increase. Notwithstanding this, the value of our total production was \$51,759,-364 less during 1921 than during 1920, owing to reduced prices.

The Branch is organized in three Divisions, viz., Dairy, Markets, and Cold Storage.

DAIRY DIVISION

THE FINCH DAIRY STATION

The year 1922 was the most successful the Finch Dairy Station has experienced during the ten years it has been in operation. The total quantity of milk received was 8,781,879 pounds, an increase of 2,195,394 pounds over 1921, and 6,712,598 pounds over 1912, the first year the station was in operation. The gross receipts totalled \$142,928.53, divided as follows:—

Cheese.....	\$	9,005 41
Butter.....		18,103 56
Butterfat in sweet cream.....		114,848 99
Whole milk.....		828 50
Skim-milk.....		142 07

The patrons received \$126,411.76, the average price per 100 pounds of milk being \$1.44. The Government realized a substantial profit from the year's operations.

The winter production of milk in the district continues to increase steadily. In the months of December, 1922, and January and February, 1923, 1,023,551 pounds of milk were received. This is nearly eleven times as much milk as was received in the same months of 1912 and 1913.

Owing to the increased production of milk in the district, an addition to the station, 46 by 24 feet, was built during the summer.

GRADING DAIRY PRODUCE IN MONTREAL

For the past three years the Dairy and Cold Storage Branch has graded cheese for sale by auction in Montreal, the work being done by one grader. Requests were received during the past year from four cheese and butter exporting houses in Montreal to have their butter and cheese also graded by officials of the Branch, and in the early part of the season six additional graders were

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appointed. Grading was commenced in these four warehouses during the latter part of June. In September and October two additional firms requested to have their cheese and butter graded, which request was complied with.

During the season, shipments of butter were graded from 575 creameries, amounting to 84,065 packages, or approximately $4\frac{3}{4}$ million pounds. The province of Quebec supplied 73,032 packages, Ontario, 7,118 packages, and the western provinces 3,915 packages. The percentages of different grades were as follows:—

Special grade.....	12.14 per cent
First grade.....	59.79 “
Second grade.....	23.89 “
Third grade.....	4.18 “

Shipments of cheese amounting to 293,000 boxes were graded from 833 factories, 508 of which were located in Ontario, 316 in Quebec and 9 in P. E. I. The percentage of different grades was as follows:—

Special grade.....	1.4 per cent
No. 1 grade.....	77.62 “
No. 2 grade.....	19.64 “
No. 3 grade.....	1.33 “

The Dairy Produce Act and Regulations, which provide for the grading of all cheese and butter to be exported, will come into force on April 1, 1923. A sufficient number of graders are being appointed to grade all cheese and butter to be exported.

THE DOMINION EDUCATIONAL BUTTER SCORING CONTEST

The Dominion Educational Butter Scoring Contest was continued along similar lines to that of 1921. Fifty creameries participated. The type and quality of the butter was more uniform than during any previous year, which shows that the buttermakers throughout the Dominion are adopting methods which are giving the finest type of creamery butter. The interest in the contest was quite as keen as when first inaugurated in 1919.

COW TESTING

No change was made in the policy of carrying on cow testing work in 1922. A Dairy Promoter was employed by the Branch in each of the following provinces: Alberta, Ontario, Quebec, New Brunswick, Nova Scotia and P. E. Island. Saskatchewan and Manitoba took over the cow testing work from the Federal Department in 1921.

We are pleased to mention again the splendid co-operation of the provincial Departments of Agriculture in carrying on cow testing work. The following table shows the extent of the work for 1922:—

Provinces	Herds	Cows	Testing Centres	Number of Samples Tested
Alberta.....	111	1,162	36	5,239
British Columbia.....	22	100	2	553
Manitoba.....	82	798	23	2,702
New Brunswick.....	137	1,061	21	4,879
Nova Scotia.....	360	2,520	48	13,497
Ontario.....	783	10,347	91	41,582
Prince Edward Island.....	164	1,046	15	5,217
Quebec.....	3,469	33,267	463	129,991
Totals	5,128	50,301	699	203,660

The above figures show an increase of 2,500 cows and 8,913 tests over 1921. In addition to the records received in the Branch, hundreds of blank forms were supplied to dairymen who did their own testing and kept their own records

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MILK UTILIZATION SERVICE

Educational work to stimulate the interest of the consuming public in the food value of dairy products has been continued during the year. This work has a close bearing on public health and it has been the policy of the branch to work in close co-operation with Dominion and Provincial Departments and all organizations—rural and urban—interested in this question. The development of the service, and the number of requests for co-operation constantly being received have made it necessary to double the staff. The following outline shows concisely the direction of effort and work accomplished:—

Publications.—Six publications, dealing with the food value of dairy products and prepared especially for housekeepers, have been issued, and a wide distribution made.

Exhibits.—Exhibits have been arranged at exhibitions and upon requests from various organizations. These exhibits are effective in pointing out the comparative food value and economy of dairy products and their special use in the diet. That they are worth while is shown by the interest of visitors and subsequent enquiries for information and assistance with local effort.

Motion Pictures.—A film, which is the property of this Branch, has been shown in many cities to call attention to this subject in an entertaining and convincing way.

Co-operation with School Officials.—Upon requests from school officials, this Branch has collaborated with them in carrying on this one phase of health education. In three cities, short talks dealing with the value of milk as food were given to each class, and the work was done more or less extensively in several other cities.

Milk Campaigns.—Milk campaigns have been conducted upon requests of local organizations. The co-operation of this Branch is given only upon request and where local conditions are favourable.

MARKET DIVISION

ICED CAR SERVICE, FOR BUTTER, EGGS AND CHEESE

As usual, arrangements were made with the different railways to operate "pick-up" refrigerator car services over specified routes for the transportation of butter and eggs in any quantity to Montreal, Toronto and Halifax. Refrigerator car service was thus available for shippers of small quantities, whereas otherwise it would only have been available for car load shippers. This service was in operation from early in May until the end of September.

Arrangements were also made with the different railway companies to operate a maximum of 160 iced refrigerator cars weekly during June, July and August, for the transportation of cheese to Montreal, Quebec and Halifax.

INSPECTION OF ICED BUTTER AND CHEESE CARS

One inspector was maintained at Toronto, one at Halifax and two inspectors, as well as a senior inspector, at Montreal, to inspect iced butter and cheese cars on arrival. Inspectors reported on the quantity of ice in the bunkers of the cars on arrival at destination, quantity of cheese, butter or eggs in the cars, condition of cars as to cleanliness, temperature and manner of stowage of the products and condition of packages. Unfavourable reports were transmitted to the responsible parties.

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During the past year 1,257 refrigerator cars carrying 27,806,499 pounds of butter were inspected at Montreal, the average temperature being reported as 51.16 degrees; also 1,623 refrigerator cars carrying 383,190 boxes of cheese and 1,301 box cars carrying 222,065 boxes of cheese as well as 89 box cars carrying 519,285 pounds of butter, were inspected. Eggs arriving in refrigerator cars at Montreal amounted to 1,350 cases weighing 81,000 pounds.

At Toronto 337 refrigerator cars with an average temperature of 52.77 degrees were inspected. These cars carried 7,080,461 pounds of butter and 6,836 cases of eggs.

CARGO INSPECTION

Staffs of inspectors were maintained at the ports of Montreal and Halifax and during the winter months at the ports of St. John and Portland, Me. In special cases one of the Montreal inspectors visited Quebec in connection with the loading of produce at that port. Inspectors were also maintained at London, Liverpool, Manchester, Bristol, Glasgow and Cardiff in the United Kingdom. The presence of inspectors on the docks in Canada and the United Kingdom is not supported by any legislation, and inspectors have no authority over shipping companies, stevedores or longshoremen, but suggestions from inspectors were usually well received. Unsatisfactory conditions as to packing, handling, loading or discharging of perishable produce were reported to shippers and to other Branches of the Department interested in the particular commodity. Self recording thermometers, or thermographs, in perforated locked wooden boxes were placed in the different holds with perishable produce. On arrival in the United Kingdom the charts were removed from the thermographs and mailed to the Ottawa office, where blue prints were made and copies sent to interested shippers, shipping companies, and chief officers of the ships concerned.

During the past season reports were received concerning the perishable produce shipped on 445 ships, and 842 thermograph charts were received, blue printed and copies sent out.

DAIRY MARKET INTELLIGENCE SERVICE

As during several years past, a market reporting service has been maintained. A market letter was issued each Monday, commencing early in April and continuing until the end of the year, giving transactions at different country boards and auctions throughout Ontario and Quebec, as well as Toronto quotations, down to noon on the day of issue. This report was sent free of charge to anyone requesting the same. Prepaid market lettergrams were sent each Monday and Friday to different provincial authorities for further distribution in the different provinces. Collect lettergrams were also sent to anyone requesting them, giving quotations on cheese, or butter, or both.

DAIRY NEWS LETTER

The publication of the monthly Dairy News Letter was continued throughout the year.

ADMINISTRATION OF DAIRY INDUSTRY AND OLEOMARGARINE ACTS

There were ninety-one convictions during the year on account of violations of the above mentioned Acts, and fines and expenses totalling \$1,269.35 were imposed. There were ten confiscations totalling 275 pounds of short weight prints of butter. This butter was sold and net proceeds of \$60.81 remitted to the Receiver General.

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COLD STORAGE DIVISION

CREAMERY COLD STORAGE BONUS

There were forty-eight applications received for creamery cold storage bonuses during the year and nine applications were held over from 1921. Five were refused and seven held over to 1923. Forty-five were paid the full bonus of \$100.

APPLE PRE-COOLING PLANT

A small experimental pre-cooling plant for apples was installed in the warehouse of the Waterville Fruit Co., Waterville, N.S., and commenced operations in August, 1922. The system of cooling is the first of its kind installed in Canada. Air is forced through crushed ice and salt by means of a fan at the rate of about 4,000 cubic feet per minute. The pre-cooling room is equipped with air ducts and a false floor for the even distribution of cold air. Return air ducts are placed on the ceiling and connect with the fan. The moisture from the melting ice is collected by baffle boards in the air ducts and carried off in a gutter before the air passes into the pre-cooling room. A temperature of from 30 to 32 degrees F. can be obtained by regulating the amount of salt which is mixed with the crushed ice. About 2,000 barrels of apples were pre-cooled during the season. It is the intention of the Branch to carry on pre-cooling experiments in this plant again next season.

COLD STORAGE NEWS LETTER

A new publication was started during the year in the form of a Cold Storage News Letter, which has been issued since October, 1922, monthly, and sent to every cold storage warehouse in Canada and to others interested in such matters. The aim of the Letter is to give items of information respecting the cold storage of perishable products, and general news of interest to those engaged in the cold storage industry.

HEALTH OF ANIMALS BRANCH

The work of the three divisions of this Branch is essentially one of protection of our live stock interests, our foreign markets, and our export food trade. Research work is also undertaken by the Pathological Division for the purpose of solving difficult problems.

CONTAGIOUS DISEASES DIVISION

The activities of the Field Division are directed toward the control and eradication of contagious diseases of live stock within our boundaries, and the prevention of the introduction of infection from outside sources.

The importation of animals from overseas has for many years been controlled by a permit system, and permits have not been granted for importations from countries where serious infectious diseases are known to exist.

This precaution has undoubtedly played an important part in keeping this country free from these diseases. As an additional precaution, cattle, other ruminants and swine are taken direct from the boat to our quarantine stations at the seaboard, where they are detained for a suitable period and kept under constant supervision by a veterinary inspector.

Owing to the prevalence of serious diseases of live stock in the countries of Europe, importations of cattle, other ruminants and swine from the Continent have not been permitted for many years, and it has been necessary to exercise caution to prevent the introduction of infection through the channels of commerce. With this object in view suitable regulations have been enforced in connection with the importation of hides, wool and hair.

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It has unfortunately been necessary to prohibit the importation of cattle, other ruminants and swine from England and Jamaica owing to outbreaks of foot and mouth disease.

Importations have, however, been permitted from Scotland, provided the animals have been in that country for sixty days immediately preceding the date of embarkation.

The regulations governing the importation of animals from the United States are similar to those enforced by the American authorities upon importations from Canada.

Pending the removal of the British embargo on April 1st, arrangements have been made to comply with the Ministry's regulations governing Canadian store shipments. As the expansion of this trade and its very existence depends to a large extent upon the strict observance of these requirements, an opportunity must not be permitted for the least criticism. Measures have therefore been taken to supervise these shipments from point of origin to the British market, and a veterinary inspector of this Branch will accompany each shipment overseas.

The first three boats carrying approximately 1045 Canadian stores sailed from St. John, N. B., during the last two weeks of the period covered by this report.

An organized field staff of veterinary inspectors is employed in controlling contagious diseases within our boundaries. Full information and statistics are outlined in the special report of the Veterinary Director General for the year 1922-23.

GLANDERS

A policy of compulsory slaughter is enforced in the control of this serious disease of horses, mules and asses.

There were approximately 247 horses slaughtered for this disease throughout Canada during the past year, 232 of these being in the provinces of Manitoba, Saskatchewan, and Alberta.

The policy of testing contact horses with mallein, and slaughtering reactors has enabled the Department to keep the disease under control, but complete eradication is a difficult problem.

It is frequently impossible to trace all contacts, and as many infected animals do not show symptoms of disease, no suspicion exists with regard to them. They are, however, centers of infection, but it is not until they, or others infected by them, develop unmistakable symptoms, that the Department is notified.

DOURINE

No cases of this disease have been detected for the past two years, and although it seriously threatened our horse breeding interests some years ago, it has been possible to eradicate it by means of a laboratory diagnostic test, and the prompt slaughter of infected animals.

MANGE

Mange in horses exists to a limited extent but only 62 animals have been found to be affected throughout this country during the past year. All infected animals and contacts are promptly quarantined and treated under the supervision of a veterinary inspector.

The situation with regard to cattle mange is satisfactory, as very few cases of this disease have been found in the old infected areas.

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Unfortunately, owing to infected animals on the "Better Bull Train" in Saskatchewan, infection was spread to several premises, and more cases of this disease have had to be dealt with in this province than in Alberta and Manitoba, the only other provinces in which this disease was found. A total of 413 infected animals necessitated the quarantine and treatment of 14,114 cattle, as it is essential to deal also with all possible contacts.

SHEEP SCAB

No cases of this disease have been found in Canada, except in the provinces of Alberta and British Columbia.

An outbreak of scabies was detected in Alberta, and upon investigation it was found that a number of exposed sheep had been shipped to British Columbia. These shipments were traced, found to be diseased, and were therefore quarantined for treatment. A total of 113 sheep were found to be affected in these two provinces requiring the treatment of 25,174 animals.

HOG CHOLERA

The provinces of New Brunswick, Nova Scotia, Prince Edward Island and the Yukon Territory have been free from this disease, but the Department has dealt with outbreaks in the other provinces. The outbreaks were fortunately not of a serious nature and were promptly controlled, requiring the slaughter of 465 hogs.

This highly infectious disease has not been so prevalent since the policy of supervising the feeding of garbage was put into force.

TUBERCULOSIS

The importance of taking suitable measures for the control of bovine tuberculosis cannot be overestimated, as there is indisputable evidence that this disease is steadily increasing, not only in cattle, but also in hogs.

Authorities state that the tuberculous cow is the chief disseminator of infection, and that if bovine tuberculosis was eradicated, the disease would practically disappear in our other domestic animals.

While the Department realized the necessity of control measures, active steps could not be successfully taken until live stock owners demanded action.

The suppression of this disease is a very difficult problem, chiefly because of its wide distribution, its chronic tendencies, and the enormous amount of money required for compensating owners of diseased animals.

The demand, however, for tuberculosis free stock is rapidly increasing, largely owing to active control measures adopted in the United States and other countries, and because it is now much more difficult to sell breeding or dairy animals, as the purchasers are insisting upon buying them subject to the tuberculin test.

Requests for assistance under the policies of the Department from municipalities and stock owners have been so numerous and constant that it has been necessary to maintain waiting lists.

80,398 tuberculin tests have been conducted under the Accredited Herd plan, 5,453 reactors have been slaughtered, and \$533,576.63 awarded in compensations; as a result of this policy there are now in Canada 435 tuberculosis free herds, 1,027 herds undergoing accreditation, and 165 herds are on our waiting list.

Twenty-four municipalities are taking advantage of the Municipal Tuberculosis Order, which has necessitated the conducting of 74,498 tuberculin tests, the slaughter of 7,860 reactors, for which \$341,317.66 has been awarded in compensation.

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Many municipalities are awaiting assistance under this order, while many enquiries are constantly being received with regard to it.

Representations having been made with reference to the many advantages of a policy for the eradication of this disease by areas, the question was given careful consideration, and it being decided that it was sound and advisable, regulations governing restricted areas were passed by Order in Council, December 11, 1922.

Soon after the passing of these regulations the Provincial Government of Manitoba requested assistance under this Order for an area in the Carman district, comprising the townships of Roland, Thompson, and Dufferin.

The first test of all cattle in this area was begun in a systematic manner on February 1st, but it has not been possible at this date to obtain complete statistics covering this work.

In addition to these three policies, the supervised plan is available to stock owners who desire to maintain tuberculosis free herds. No compensation is paid under this plan, but the Department places at the disposal of the owner the services and advice of its veterinary officers free of charge. Just as much care is taken to clean up these herds as under the other policies, and owners who have taken advantage of this plan upon finding that new herds could not be accepted owing to shortage of funds under the other policies are to be commended.

The tuberculin used in this work is manufactured by the Pathological Division of this Branch.

ANTHRAX

Only one case of this disease was confirmed in this country during the past year. Anthrax has never been prevalent in Canada, only isolated outbreaks occurring occasionally in certain districts.

RABIES

This disease has not existed in this country during the period covered by this report.

INSPECTION OF STOCK CARS AND YARDS

An organized force of inspectors is maintained for the purpose of supervising the cleansing and disinfection of railway stock yards, corrals, chutes, and stock cars.

With a view to disinfecting stock cars constantly and systematically an order is enforced which requires all empty stock cars passing through certain definite points throughout this country to be held and disinfected at these points. In addition to the inspectors stationed at the points outlined in this Order, a number of travelling inspectors are employed who cover definite territories, and supervise the work of local men.

QUARANTINE STATIONS AND INSPECTION PORTS

Quarantine stations and inspection ports are maintained on the Atlantic and Pacific coasts and along the International boundary. Suitable regulations are enforced with regard to the importation of all animals from foreign countries.

MEAT AND CANNED FOODS DIVISION

The work of this division, which is both economic and hygienic, varied little in general character from that of the preceding year. It was, however, materially increased as a result of the growing activities in connection with the

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manufacture of food products, and special investigational work along the line of food standardization, coupled with strict enforcement of the laws governing importations of food products, which renders chemical and bacteriological examination together with grading imperative, in order that nothing but sound, wholesome products, conforming to Canadian standards, may be permitted to enter consuming channels.

Apart from the regular activities of this division, meetings of many kinds were attended by its representatives in order that every assistance might be rendered those interested in the questions relating to the preparation of the different food materials coming within the purview of the Meat and Canned Foods Act.

During the fiscal year ending March 31, the food manufacturing establishments in Canada under the supervision of officers of this division, comprised: meat-packing, jam, pickle and fruit canning factories, condensed and evaporated milk establishments and apple evaporators.

In the meat-packing establishments the total number of animals given ante and post-mortem examinations was 3,499,677 divided as follows:—

Cattle—841,470, an increase over last year of 15.39 per cent.

Sheep—623,342, a decrease under last year of 4.79 per cent.

Swine—2,034,865, an increase over last year of 17.81 per cent.

In the establishments wherein poultry products are prepared for food, the number of post-mortem examinations conducted was 76,674.

The number passing inspection as sound, wholesome, healthful and fit for human food, was: cattle, 830,001; sheep, 622,580; swine, 2,029,426; poultry, 74,580.

The number failing to pass inspection and condemned as unfit for food, was:—cattle, 11,469; sheep, 762; swine, 5,439; poultry, 2,094.

On reinspection, 1,002,332 pounds of meat and meat food products that had become sour, tainted, or otherwise unfit for food since the inspection at the time of slaughter were condemned.

In the canning establishments a vast amount of constructive work has been carried on by officers of this Division, who have been constantly striving to improve the sanitary conditions in these establishments where food is being prepared, as well as render every assistance to those engaged in this all-important present-day Canadian industry.

The quality of the products manufactured, has during the past year shown considerable improvement, due chiefly to improved methods of handling and preparation, and this will conduce to placing Canadian food products on a very high plane, both in this country and on the foreign markets.

The demand for greater care in the production of clean, wholesome food products is being made by progressive manufacturers in a most gratifying manner. Many are discarding or radically modifying old systems and replacing them with modern, up-to-date ones of a more sanitary nature. Throughout the industry there is not only the spirit of co-operation but an earnest effort to obtain information as rapidly as possible because of the growing appreciation of the value and necessity for research work along the lines tending towards the conservation of perishable foodstuffs.

A vast amount of research work has been carried on during the year in connection with the composition of the pure fruits, and fruit juices used in the manufacture of jams, jellies, etc., and this is of great value in interpreting the results obtained in the analysis for adulteration of these various food materials. The experiments conducted cover samples from extremely variable sources and represent a large range of varieties.

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Investigations regarding fundamentals in connection with the putting up of the different food materials that come within the purview of this Division's activities are being continually carried on, in order that new truths may be learned for future application. The results obtained from these investigations are of the utmost practical value. Every effort is being made to bring the results of this work and the industrial application of same to the attention of those most vitally concerned, demonstrations being carried on wherever the opportunity affords.

It is the intention of those entrusted with the administration of this division to have the essential facts distributed to the industry as all work conducted is essentially for immediate betterment along all the lines.

Plans for future experimental work in connection with dehydration are being formulated in order that every assistance may be rendered those interested in this phase of food preservation. The results accruing from work along this line should be increasingly valuable to the producer, manufacturer and consumer alike.

The canning of foods has now assumed gigantic proportions. The methods employed in the different establishments wherein food is prepared in this way have been greatly improved and it may be stated that modern scientific canning leaves little to be desired.

The past year has demonstrated very forcibly the great advantages accruing to the country both economically and hygienically from the supervision and control which this Division exercises over the establishments manufacturing food products as well as over foreign imports.

Only one case of food poisoning, has been reported in this country through eating materials put up under Federal supervision.

In connection with imports it might be well to point out that following the outbreak of food poisoning in Loch Maree, Scotland, during the early part of the year, which was of a most disastrous nature, all imported canned meat food products were held at the port of entry until such time as a chemical and bacteriological examination was conducted.

Not only has the scope of the work been extended but the influence of the Division has grown materially in pure food matters. Were it not for the thorough and efficient system of inspection maintained by its officers, Canada to-day could not export one pound of meat or meat food products, as other countries demand that these be covered by certificates guaranteeing such shipments as sound, wholesome, healthful and fit for food.

The standardizing of canned fruits and vegetables under the Meat and Canned Foods Act has considerably enhanced the quality of the products put up and has been conducive to most beneficial results, economically, as evidenced by the increasing demand for these products of Canadian origin on the foreign markets. Complete control is exercised over same; no shipments being allowed to enter into export trade unless covered by certificates.

PATHOLOGICAL DIVISION

The Laboratories and Research Stations of the Pathological Division of the Health of Animals Branch, have had the busiest year in their history, and have carried out a very great amount of highly important work which includes the manufacture of various biological products on a large scale, laboratory examinations of pathological material, meat and canned foods, milk, water, specimens, etc., also special investigations and research on problems of importance to the live stock industries.

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BIOLOGICAL LABORATORY, OTTAWA

Special efforts have had to be made to meet the very great increase in the demand for our Biological Laboratory products; 521,814 doses of the different preparations mentioned below, have been manufactured and issued, the increase in production over the previous year being 175,325.

Tuberculin.—Three different kinds of tuberculin, for the subcutaneous, intradermal and ophthalmic tuberculin tests, are made and a total of 482,102 doses have been issued as compared with 300,755 for the previous year. This large amount of tuberculin is required in connection with bovine tuberculosis eradication throughout the Dominion. It is essential for the success of this work that the tuberculin should be prepared with the highest possible skill and that it be accurately standardized and tested before being put into practical use. Our tuberculin has given uniformly satisfactory results, and there is every reason to believe that the preparation of this product in our laboratories has reached a very high standard of excellence.

Mallein.—The control of glanders is made possible by the testing of all animals concerned in an outbreak, with the laboratory product known as mallein; 17,750 doses have been made and issued to our inspectors during the year, as compared with 10,240 for the previous year.

Blackleg Vaccine.—21,310 doses were issued during the months of April and May, 1922. The manufacture of this product in our institutions has now been discontinued, for the reason that our object, to induce owners of live stock to vaccinate and protect their animals against blackleg, seems to have been fully accomplished and that blackleg vaccine can now be obtained very easily and cheaply from a large number of commercial firms.

Anti-abortion Vaccine.—Small quantities of this vaccine have been issued to practising veterinarians, free of charge, for the experimental treatment of a limited number of suitable herds. Similar experiments are being made practically all over the world, contagious abortion of cattle being apparently a world-wide condition. The efficacy of vaccination is still under question, but there would appear to be no doubt that the administration of a very carefully prepared living culture of the *Abortus bacillus* to suitable animals in an infected herd, does result in a reduction of the number of abortions. Abortion vaccines are very much advertised by commercial firms and can easily be procured at a reasonable price.

It is not desirable that our laboratories should compete with commercial firms in the manufacture of veterinary products required by veterinarians in their general practice but we consider it essential to make such products as tuberculin and mallein, required by the veterinary inspectors of this Branch in their work of controlling such important diseases as tuberculosis and glanders. The demand in this connection, which has been increasing year by year, reached such a point that it had become absolutely impossible to prepare these products in the quantities required, in the small laboratory which has done service for many years at the Central Experimental Farm. More spacious quarters had to be provided and a search was made for a suitable building in the city of Ottawa. Finally, the old residence, known as the Devlin residence, located on Cliff Street, was taken over and converted into a laboratory, and the move into these quarters was made during the month of October. This building, constructed as a residence, of course does not permit of modern laboratory facilities and conveniences. We can only consider it as temporary, hoping that it may soon be possible to construct the modern laboratories which must be regarded as essential for such highly technical laboratory work and investigations.

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It is interesting to note that our manufacture of these biological products during the past year—products which are indispensable in our work of controlling disease and which if not manufactured by us, would have to be bought from outside sources, saves the Department a bill for \$78,272, if the value of these products is based on the low price of fifteen cents per dose, which is lower than the market price.

Laboratory examinations, diagnoses and tests.—Six hundred and fifty-six pathological specimens and carcasses, blood samples, meats and canned foods, contaminated water, etc., have been received and reported upon.

Special Investigations and Research.—The great amount of routine work indicated in the foregoing and to which we are compelled to give first attention has made it impossible to meet all the requests made for special investigations and research. However, work is being carried on, as time permits, in connection with parasitical infestations causing severe losses in sheep, swine and foxes, hemorrhagic septicaemia, botulism, forms of forage poisoning and the chronic progressive forms of pneumonia in calves, sheep and swine.

RESEARCH STATION, HULL, P.Q.

At this Station the study of different phases of the tuberculosis problem is continuing, although the laboratory accommodation is very primitive. We have been enabled to conduct some important experiments on animals in connection with this disease. A small number of cattle, horses and sheep are maintained for experimental purposes and, in addition, a large number of rabbits, guinea pigs and small laboratory animals are bred and utilized for various tests.

It has been necessary to construct a small animal house for the accommodation and breeding of these laboratory animals. This building was erected under the supervision of the Public Works Department and finished in December, 1922. The testing and standardizing of the products manufactured at the Biological Laboratory is carried out at this Station. As a result of some painstaking research work we have devised some entirely new methods of testing and standardizing these important products, and it is probable that our methods will be adopted in other countries.

Glanders in Man.—The medical authorities in Winnipeg have consulted us in connection with two cases of glanders in man. We suggested that a trial be made of an immune horse serum which we had prepared at this Station, in connection with our testing of mallein. Quantities of this serum were forwarded to the physicians in charge of the cases and the patients were duly treated, with the result that, instead of the usual fatal termination of glanders in man, very rapid recoveries took place and a complete cure has been reported.

The importance of bovine tuberculosis and the enormous cost of eradication warrants extensive and continuous research; also the erection of the necessary stables and laboratory for that purpose. The possibilities of immunization, prevention and other means of combating this wide-spread infection should not be overlooked. Any advanced knowledge or a new discovery in connection with the control and eradication of this supremely important disease may well be the means of saving millions of dollars.

VETERINARY RESEARCH STATION, LETHBRIDGE, ALTA.

Routine work at this Station includes the laboratory blood tests in connection with dourine of horses and the examination of specimens from the other divisions of this Branch and from outside sources. Seventy-seven tests and examinations were made and reported upon.

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Special investigations have been made on the cause and treatment of lip and leg ulceration in sheep, bot anaphylaxis or "Jiggers" in horses, plant poisoning, cattle mange, swamp fever of horses and contagious abortion of cattle.

A disease of cattle in the Edmonton district, affecting up to fifty per cent of cattle in different herds, with some resemblance to actinomycosis, was investigated. By laboratory work and experiments the condition was shown to be due to a streptothrix. The condition is being treated with potassium iodide, with good results.

The slaughter of buffalo at Wainwright, Alta., was attended by our pathologist. Considerable pathological material was collected and taken to the laboratory for study. A full report of the various pathological conditions encountered in these buffalo is in preparation.

The pathologist in charge of this Station spent two months in the laboratories of the United States Bureau of Animal Industry, Washington, D.C., for studies in parasitology and on contagious abortion of cattle, and gained some very valuable information.

VETERINARY RESEARCH STATION, AGASSIZ, B.C.

The work at this Station and of the pathologist in charge is devoted mainly to the study of pathological conditions which seem to be more or less peculiar to the province of British Columbia. In some districts of the province the soils, plants and forage crops are known to be deficient in calcium, phosphoric acid and other minerals and the apparent connection between these deficiencies and certain diseases is under investigation, particularly red-water in cattle, premature lambing or abortion, goitre, hairless pigs and immature foals.

Further observations have been made of Bovine Coccidiosis, which seems to be increasingly prevalent in the province of British Columbia. Methods of control have been devised and these when put into practice have given satisfactory results. Further information is being obtained in regard to bracken poisoning and other forms of plant poisons.

Various meetings are attended by the pathologist in charge, and useful information and advice to live stock owners is distributed. The laboratory routine work included the examination of 282 specimens received during the year.

FOX RESEARCH STATION, CHARLOTTETOWN, P.E.I.

A close study has been made of the parasites of foxes and of the efficacy of various remedies which are marketed for the control of parasites in these animals. The pathologist in charge has demonstrated the great value of oil of chenopodium and carbon tetrachloride for the treatment of intestinal worms, and it is estimated that the employment of those remedies now means the saving of many thousands of dollars to the fox breeders. In connection with the export of foxes to the United States, a great deal of laboratory work has been necessitated in the examination of fox feces.

A small experimental station for work on live foxes is maintained just outside of Charlottetown, while in the city itself, new quarters have been fitted up as a laboratory.

In the course of the year a great many of the fox farms have been visited and the meetings of the Fox Breeders Association attended. The information and advice given by our pathologist on these occasions has been very highly appreciated by the fox farmers.

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During the year a very complete bulletin entitled "Fox Farming in Canada" was published. This bulletin includes the work done by the pathologist in charge of the Fox Research Station, Charlottetown, and the work done by the Biochemist in charge of the fox investigation carried on at our Research Station, Hull, P.Q., in co-operation with the Research Council.

LIVE STOCK BRANCH

HORSE DIVISION

During the fiscal year just closed a very decided improvement has taken place in the horse industry. There is a steadily growing demand for horses for farm, bush, and city work at fair prices, while the demand for saddlers and hunters is greater than the supply. There is also a good market for horses of the same type, though lacking somewhat in quality for light delivery, police and remount work. Taken by and large the year just closed has been by far the most satisfactory from the horseman's standpoint, of any since 1914. During the first dozen years of this century, horses were shipped to the western provinces by the thousands. From the outbreak of the War until a couple of years ago few were shipped in either direction. Last year, however, while a few carloads went from Ontario to the western provinces, particularly British Columbia, in the neighbourhood of two hundred and twenty-five carloads came through Winnipeg, enroute to Ontario, Quebec and the Maritime Provinces, amongst which were a few carloads consigned to Prince Edward Island. This will show the change that has taken place during the last few years. In the finding of a market for many of these horses, officers of the Live Stock Branch lent very valuable aid which has been acknowledged by breeders and horsemen generally.

People are taking up riding and hunting and accordingly saddler and hunter horses are much in demand. This is particularly true in the United States where each city of any size has a number of riding or hunting clubs and accordingly there is a steadily growing demand for horses of this type. In fact, at the present time, dealers are unable to pick up sufficient good quality animals to supply the demand.

The great improvement in the market for horses is bound to have its effect on breeding operations and for this reason, each farmer or breeder should, before deciding what to breed, look over the whole situation carefully and be governed by the market demands in conjunction with what he himself can best produce. In the past, in many sections of Canada, market demands were not considered, while sticking to one breed, and thus systematically grading up was seldom practised. The mixing of breeds coupled with lack of feed and care together with bad management was largely accountable for the fact that there are thousands of nondescripts to-day in the country for which there is no market. If the breeder of the future is going to be successful he must raise a type of horse for which there is a market demand. If he is breeding draught horses, then he should by proper selection, feeding and management, aim to produce a heavy weight draughter that will find a market wherever draughters are wanted. On the other hand, if he is raising light horses, by making use of the proper breed of sire, he can produce saddlers and hunters, or failing in this remount, fire, police and delivery horses. Thus if a horse lacks the quality to make him a high class hunter, he will still be useful in one of the other two classes.

As normal conditions return there is bound to be a steady demand for horses. As it takes some years to develop a horse, Canadian farmers and

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breeders would do well to commence now, otherwise there is bound to be a decided shortage in our horse supply within the next half-dozen years. The successful breeders, however, will be those who decide on a definite marketable type, and then by careful selection, care and management, produce that type.

CLUBS

The policy of making grants to clubs that hire approved stallions was started in 1915 and has gone steadily on even under the adverse circumstances of the war years and the even more unfavourable ones from an economic standpoint, that followed. The scheme which is based on the "Scottish Premium System," provides that any district which forms a club for the purpose of hiring an approved pure-bred stallion, and which complies with the regulations, is paid a grant equal to one-third of the amount paid by the club members as fees to the stallion owner. This policy has been favourably commented on, not only by the best of Canadian breeders, but also by horsemen of other countries. It is undoubtedly the only policy of its kind in existence to-day, whereby the owners of mares as well as the proprietors of good stallions are both protected. The former are enabled to secure the services of a first-class horse at a very nominal fee, while the latter are assured by contract, of a certain definite return from the service season. Thus the keeping of good stallions is made possible, while community breeding, better feeding, care and management is encouraged amongst the mare owners.

The organization of communities for the purpose of hiring a stallion has in many cases been only one phase of the work. Colt shows have been established, which have done much to create an interest in better breeding and at the same time have been the cause of leading the breeders to study all phases of the question in an endeavour to produce winners. Community horse sales have also been carried on in certain districts; a healthy rivalry has also sprung up in sections as to which club will secure the services of the best stallion. Another point which should not be overlooked is the fact that clubs are required to stick to one breed and thus grade up a definite type in the community. Clubs are also protected in that all stallions are inspected by experienced horsemen and judges so that only sound, individually excellent animals that possess the size and characteristics of the breed required will be allowed to stand for service in a club. Thus the ordinary breeder is given double protection in using a club horse. As an example of what this inspection means, it might be pointed out that in one Province in one year, twenty-three new stallions were hired, for service; of this number only ten passed inspection. The other thirteen were disqualified because of some hereditary unfitness or malconformation which rendered them unfit to be used by men wishing to improve their horse stock. In the majority of cases the clubs in question thought they had hired extra good animals and their officers were much surprised when notified to the contrary.

The steady elimination of all unsound, also undersized stallions, and those that from bad conformation are unfit to produce good quality horses is slowly but steadily having its effect. Stallion owners today admit, particularly in the draught classes, that the good big ones are the horses wanted and recent importations have been made with this in view.

BREEDING STATIONS

In 1921 owing to representations made by various parties and after a study of the conditions, it was decided to encourage in certain suitable districts, the breeding of saddlers and hunters, remounts, fire, police and delivery horses by the use of good, big Thoroughbred stallions of the Cross Country Hunter type

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In order to make each district a real breeding centre, it was decided that at least three stallions should stand for service under the supervision of one man. A grant was made to each station, sufficient to ensure the stallion owner against loss and to enable him to stand the stallions at a service fee which would be low enough to compete with the ordinary horse standing for service in the country. All mares bred to these stallions must be sound, weigh not less than 1,050 pounds and up to 1,400 pounds and be free from coarseness; head of medium size; neck clean cut; the hind legs properly set; the hocks free from bogginess and the feet of normal size. By mating such mares to selected stallions it has been found that a high percentage of saddlers and hunters can be obtained while the others are useful for other work above outlined.

The first station was started at Roddick Lake where three splendid stallions are standing for service and where already good results are being obtained. In 1922, two more stations were added, one at Chaffey's Locks, Ont., and one at Millarville, Alta. In both cases, good, big thoroughbreds of the required type stand for service. As an evidence that the horses at these stations met with the approval of the breeders of the district, it is only necessary to say that the average number of mares bred to each stallion was seventy, and the outlook for the next season is even better. Requests have also been received for additional stations for the next year.

In connection with these stations, colt shows, limited to the colts sired by the stallions, are held. Already two shows have been held at Roddick Lake which have been particularly successful. It should perhaps be said in passing that a thoroughbred stallion had been standing in the district for some years before, and that the colts out of even ordinary mares have been selling at fair prices. It is hoped in a few years to make each of these stations the centre of a district where buyers will readily go, knowing that they can procure in numbers, horses of a required type.

SILVER BLACK FOXES

The silver black fox industry in Canada had its inception on Prince Edward Island in the vicinity of Tignish, somewhere in the late eighties of the last century. Of its rise and growth much has been written. All that need be said is that the industry has now spread from Atlantic to Pacific and is firmly established on a solid business basis.

In 1920, the Canadian Silver Black Fox Breeders' Association was incorporated and a stud book opened for the registering of all foxes that came up to a required standard, and that had been bred in captivity for a certain number of generations. At the request of the breeders, the Live Stock Branch took over the inspection of the foundation stock. To date, in the neighbourhood of 10,000 foxes have been inspected; tattooed in the ears for identification; and duly registered in the office of the Canadian National Live Stock Records. Although breeders have until the end of 1925 to get in applications for their first inspection, nevertheless, it is hoped to do the most of the work during the next two years.

Inspection can only be made from late September until about the middle of January. The work cannot be started before September, owing to the fact that it is the quality of the fur that makes silver foxes valuable and accordingly it is necessary to see them when their winter coats are either growing, or in prime condition. Again, inspection must be stopped about the middle of January, as at that time the breeding season starts and ranches are invariably closed to all except those in charge.

Parties deciding to go into fox ranching should buy only foxes that are registered in the Canadian National Records, properly tattooed with the breeder's

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initial in one ear, and the registered number in the other and for which the seller can supply a corresponding Certificate of Pedigree furnished by the above mentioned Records Board.

The question is often asked as to the future of the silver fox industry. In reply, it should be said that there is a steadily increasing demand for furs of all kinds while at the same time the supply from the wilds is just as steadily decreasing. Accordingly, in order to keep up the supply, it will be necessary to breed more and more fur bearing animals in captivity. As the black fox produces the highest priced fur and one which cannot be successfully imitated, his pelt is bound to be ever in demand.

CATTLE DIVISION

DISTRIBUTION OF PURE-BRED BULLS

During the past ten years the Live Stock Branch has interested itself directly in securing a more widespread use of pure-bred bulls by farmers throughout Canada. Since the spring of 1913, bulls have been loaned to specially organized associations in newly settled districts and backward sections of the older provinces. Up to the present time, 3,783 bulls, representing an investment of nearly \$600,000, have been loaned under this policy.

The improvement in the young stock and the stock annually marketed has in recent years been very noticeable in many of the districts in which the Department's bulls have been standing for service for several seasons. It is not the policy of the Branch to continue assistance to a district after the farmers there are in a position to purchase their own sires and no bulls are discarded until their usefulness as sure and satisfactory sires is over. The aim has always been to avoid making the policy an extravagant one. While, as already stated, approximately \$600,000 has been invested in bulls, the Branch has to date turned in from the sale of old and discarded bulls, nearly \$150,000. The bulls on hand at the present time, numbering approximately 1,500, cost the Branch over \$300,000. Figuring these bulls as an asset and adding the \$150,000 already turned in from the sale of discarded bulls, leaves only \$150,000 as representing the net amount on the total capital investment of \$600,000 which in ten years' time has actually been absorbed in carrying on the work. During the past three seasons the Branch has been securing a large proportion of its supply of bulls from the various provincial consignment sales.

SIRE PURCHASE POLICY

The above policy was inaugurated by the Branch two years ago with a view to encouraging the more general use of properly selected sires and of providing an agency through which farmers could secure such sires with the least possible expense and difficulty.

Under the terms of this policy the Branch is prepared to fill orders for bulls, boars and rams under certain conditions. An applicant is required to deposit a percentage of the purchase price with his order. The sire when secured is shipped to him on approval. If no complaint regarding the animal is made within three days after delivery the balance of the purchase price becomes due.

In the provinces in which this policy has been operative, a considerable number of bulls have been purchased under its terms for farmers who were not in touch with breeders and who were so situated that they could not start out to purchase a sire for themselves without running up a travelling expense bill out of proportion to the amount of investment involved. This policy has

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also been used in handling bulls through exchange stables in Ontario and in purchasing bulls for the Live Stock Improvement Train which operated in Manitoba in the spring of 1922. In the latter cases the bulls were not, of course, purchased on order but were bought outright, exposed for sale at original cost price, plus freight and maintenance charges, and any not disposed of were utilized in connection with the loan policy. In the past two years upwards of two hundred bulls have been sold to farmers under this phase of the policy.

SCRUB BULL CAMPAIGN IN ONTARIO

During the year 1922, the Live Stock Branch co-operated with the Ontario Department of Agriculture and with the Live Stock Improvement Committee in promoting an anti-scrub bull campaign in a number of selected counties. One officer of the Branch has devoted all of his time to this work and has assisted the agricultural representatives in several counties in the organization and carrying on of their campaigns. Exchange stables were opened during the year at a few central points through which a number of carefully selected bulls were sold to farmers interested in improved stock as a result of the campaign.

A grant of \$2,500 was made to the Live Stock Improvement Committee to be used for advertising purposes. As an outgrowth of the work carried on in 1922, the Live Stock Improvement Committee recommended to the Provincial Department that a Better Live Stock train be run over the Canadian National and Canadian Pacific lines in Ontario during the months of March and April, 1923. The railways co-operated in equipping a special train for this purpose and support was given by the Toronto Live Stock Exchange, Industrial Council of Meat Packers and the Co-operative Wool Company, Limited. A considerable number of bulls purchased from the Branch by Ontario breeders were sold off this train to farmers at the different points visited. A noticeable feature of this phase of the undertaking was that really high class bulls were easier to sell at correspondingly higher prices, than were the ordinary bulls at half price.

CAR LOT POLICY

This policy provides for payment by the Live Stock Branch of reasonable travelling expenses of farmers residing in Canada who purchase stock at central stockyards for return to country points. In Eastern Canada, the assistance rendered is confined to purchases of female breeding stock, cattle, sheep, or hogs. In Western Canada, the policy covers stocker and feeder cattle in addition to breeding stock. Purchasers have to fulfil certain requirements of the Department in connection with their shipments and to give satisfactory assurance that none of the stock is being purchased for speculative purposes.

This policy has proved very valuable as an educational agency in that its terms have encouraged farmers from different parts of the country to visit the stockyards and to become acquainted with methods of doing business at these points and has unquestionably played a very important part in encouraging the return of unfinished cattle and sheep to country points for further feeding and also in the return of young female breeding stock, particularly from yards in Western Canada. The cost to the Department of all cattle shipped under the terms of this policy during a period of three years averaged only fifty-nine cents per head. The average cost of all sheep shipped during the same period was slightly over eighteen cents per head.

CAR LOT SHIPMENTS TO DECEMBER 31, 1922

Year	Steers	Heifers	Sheep
1916 (3 months).....	6,208	3,113	1,407
1917.....	11,334	10,411	1,800
1918.....	20,703	18,745	7,978
1919.....	22,490	17,550	9,408
1920.....	14,009	7,957	6,317
1921.....	8,599	7,659	9,968
1922.....	5,681	4,897	3,121
	89,024	70,332	39,999

FREE FREIGHT POLICY

The Free Freight Policy was inaugurated in the fall of 1917 by the Live Stock Branch in co-operation with the railway companies of Canada with a view to preventing, as far as possible, the slaughter or exportation of useful heifers, young ewes, and young sows offered for sale on the open market at central stockyards. Under this policy farmers are entitled to ship from stockyards to country points female breeding stock of the classes mentioned without payment of freight charges on same provided the owner has not purchased for speculative purposes.

Since the inception of the policy, September 21, 1917, shipments under its terms from the different yards up to December 31, 1922, number as follows:—

Name of Yard	Heifers	Ewes	Sows
Edmonton.....	26,565	10,159	156
Calgary.....	33,436	47,754	155
Winnipeg.....	25,397	10,523	311
Prince Albert.....	146	160	40
Moose Jaw.....	484	350	
Toronto.....	2,478	14,138	
Montreal.....	193	452	11
	88,699	83,536	673

Shipments for the twelve months ending December 31, 1922, were 10,385 heifers and 7,984 ewes.

BOYS' BREEDING CLUB POLICY

The objective of this policy, which was inaugurated a year ago, is to increase the ultimate profits of the cattle industry,—

- (1) By stimulating and promoting interest on the part of farm boys in breeding, feeding and marketing of good cattle.
- (2) By encouraging a closer study of production and marketing costs with a view to eliminating wasteful and unproductive methods and to realizing the highest net returns for the product marketed.
- (3) By demonstrating the importance of maintaining a proper balance between individuality and productive capacity in appraising breeding stock.
- (4) By increasing the commercial value of the cattle of the country through wider distribution of good breeding stock.
- (5) By increasing the value of the cattle of the country through the principle of community breeding.
- (6) By providing a means of demonstrating the importance of proper feeding and management in developing and thereby increasing the value of young breeding stock.

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During the season of 1922 a number of clubs were organized under this policy, particularly in Western Canada. In the Maritime Provinces and in Quebec the organization of clubs under the dairy section of the policy has, in the case of certain breeds, been limited only by the available supply of suitable heifers. The greatest care has been taken to select only well-bred heifers of good individuality and the co-operation of the breeders has been secured in pricing these heifers to the boys at figures which should enable them to finance their purchases out of the production of the heifers themselves. In operating the clubs each boy is required to keep a careful record of the season's operations both as regards the heifer herself and as regards her progeny. Competitive features provide incentive and interest and by linking up the work with the Distribution Policy and with the Record of Performance, provision has been made for continuous constructive work from season to season.

RECORD OF PERFORMANCE FOR PURE-BRED DAIRY CATTLE

During the year 1922-23 there has again been a large increase in the number of cows entered in the test. Applications for entry of three thousand eight hundred and sixty-eight cows were accepted during the past year, an increase of eight hundred and eighty-two over the preceding year. At the present time cows are entered for the test on seven hundred and twenty farms throughout the Dominion as compared with six hundred and forty farms at the same date last year. The present staff of inspectors is quite inadequate to cope with the work and it has therefore become necessary to apply for the appointment of additional men.

As forecasted, the rules of entry have been amended so that now applications for entry are accepted only on condition that the owner enters all his pure-bred milking untested normal cows in the test. The object of this rule is to stop the practice of some breeders entering one or two of their cows and giving them special care in order to make records which would be, in many instances, considerably higher than the average production of the entire herd.

During the past year, a number of excellent records have been made in the Record of Performance, the outstanding one being that of the Holstein-Friesian cow "Agassiz Segis May Echo" owned by the Dominion Government at the Experimental Farm, Agassiz, B.C. This cow holds the world's butter-fat record for all breeds and ages having produced in 365 days, 30,886 pounds milk; 1,345 pounds butter fat.

Following is a brief summary of the year's work:—

NUMBER OF COWS ENTERED FOR THE TEST

Ayrshire.....	1,085
Brown Swiss.....	5
French-Canadian.....	69
Guernsey.....	110
Holstein-Friesian	1,350
Jersey.....	860
Red Polled.....	20
Shorthorn.....	369
Total.....	3,868

NUMBER OF RECORD OF PERFORMANCE CERTIFICATES ISSUED

	Cows	Bulls
Ayrshire.....	359	12
French-Canadian.....	24	1
Guernsey.....	63	4
Holstein-Friesian	522	21
Jersey.....	482	15
Red Polled.....	9	1
Shorthorn.....	139	3
Totals....	1,598	57

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TOTAL NUMBER OF CATTLE ISSUED SINCE THE COMMENCEMENT OF THE RECORD OF PERFORMANCE

	Cows	Bulls
Ayrshire.....	2,552	108
French-Canadian.....	136	4
Guernsey.....	144	6
Holstein-Friesian.....	3,215	144
Jersey.....	1,308	45
Red Polled.....	12	1
Shorthorn.....	659	14
Totals.....	8,026	322

POULTRY DIVISION

The falling off in the price of poultry products at the beginning of the last fiscal year was not long in evidence, and a fairly high level has since been maintained for both eggs and poultry. Last spring the cost of eggs into storage was almost as much as it was the previous spring. Consumption has increased during the past year and poultry keeping has continued to be remunerative to producers. There is a feeling at the present time very strongly in favour of a continuance in poultry keeping, and in a good many instances the number of poultry kept is being increased.

The policy of the Dominion Live Stock Branch with respect to the poultry industry is to bring about a greatly increased consumption of eggs and poultry both at home and abroad.

To this end legal standards for eggs have been provided and during the past year the consuming public has been invited, when making purchases of eggs, to ask for a specific grade—Specials, Extras, Firsts, or Seconds, and to make sure that the eggs purchased come out of a container marked with the name of the grade purchased, and by so doing to create a differential in price between specific qualities of eggs, such differential precipitated by the consumer's demand to be carried back to the producer as a means of stimulating the production and marketing of the grade or grades most in demand; in other words, making provision that the differential in price between specific grades shall be the best possible incentive to the production of a high grade product.

In the suggested amendments to the Egg Regulations, now under consideration, eggs for domestic consumption are fully covered, provision being made for them being sold on grade, and returns made to first shippers on a graded basis.

CO-OPERATIVE MARKETING AND POULTRY PROMOTION

The encouragement of co-operative marketing is being continued and is one of the many phases of the work carried on by the District Poultry Promoters and their staffs. The work of these men includes all phases of marketing problems as relating to eggs and poultry.

This is the first year on record when live and dressed poultry have been shipped from the Prairie Provinces to eastern markets, and we are safe in saying that never in the history of the West have such prices been realized by producers. A few cars were shipped from Alberta to the British Columbia markets. Several cars of poultry have been assembled and shipped during January, February and March of this year, and every effort is being made to spread shipments over a longer period than was previously thought possible.

In the East, car lot shipments of live and dressed poultry have been made from the Maritime Provinces and Quebec to Montreal, Boston and New York, with entirely satisfactory results to producers.

In connection with eggs, progress is reported from all provinces in which Poultry Promoters are located. Possibly the most outstanding example of suc-

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cessful co-operation in Canada to-day is the British Columbia Co-operative Exchange. At the present time British Columbia eggs are being placed on the Toronto and Montreal markets at a price that compares favourably with the price at which United States fresh eggs can be imported.

In spite of the high tariff now charged on eggs sent from this country to the United States, the Egg and Poultry Co-operative Association of Prince Edward Island is still shipping its eggs to United States markets. This is possible for the reason that they sell a graded product which in past years has been found to give entire satisfaction to United States buyers.

In Ontario and Quebec, progress is being made in an organization way, and in the former province, an example is being made in one county of the uniting of all the egg circles in that county shipping to a central, the organization being on a share capital basis.

THE ADMINISTRATION AND ENFORCEMENT OF THE EGG REGULATIONS UNDER AND BY VIRTUE OF THE PROVISIONS OF THE LIVE STOCK PRODUCTS ACT, 1917, AND AMENDMENTS, 1919.

For the purpose of administration, Canada is divided into two sections, viz., Eastern and Western. The Eastern Section covers Ontario east of Port Arthur, Quebec and the Maritime Provinces. The Western Section covers territory west of the Great Lakes including Port Arthur. The following tables give a record of inspections for the calendar year, 1922.

TABLE 1

STATEMENT OF INSPECTIONS EASTERN SECTION

Months	Number cases inspected to date	Total shipments approved to date	Total shipments not approved to date
January....	50	2	
February....	50	2	
March.....	575	4	
April.....	17,536	48	
May.....	66,458	173	3
June.....	88,627	241	5
July.....	97,496	274	5
August.....	108,372	304	5
September....	126,931	334	7
October.....	169,623	492	10
November....	208,392	593	14
December....	216,895	636	16

STATEMENT OF INSPECTIONS WESTERN SECTION

January....	938	4	
February....	938	4	
March.....	4,610	20	
April.....	24,113	82	15
May.....	60,785	198	30
June.....	83,249	269	34
July.....	94,829	309	39
August.....	104,997	333	49
September....	109,743	349	51
October.....	123,990	381	56
November....	133,913	401	65
December....	144,762	427	67

STATEMENT OF INSPECTIONS TOTALS

Months	No. cases inspected to date	Total shipments approved to date	Total shipments not approved to date.
January.....	988	6	
February...	988	6	
March.....	5,185	24	
April.....	41,649	130	15
May.....	127,243	371	33
June.....	171,876	510	39
July.....	192,325	583	44
August	213,369	637	54
September...	236,674	713	58
October.....	293,613	873	66
November....	342,305	994	79
December.....	361,657	1063	83

TABLE 2

COMPARATIVE STATEMENT OF INSPECTIONS, INTERPROVINCIAL AND EXPORT SHIPMENTS OF EGGS

	Export		Interprovincial		Total	
	Number inspections	Number cases	Number inspections	Number cases	Number inspections	Number cases
1921.....	440	140,155	548	182,544	988	322,699
1922.....	363	114,752	775	244,550	1,138	359,302

TABLE 3

COMPARATIVE STATEMENT OF INTERPROVINCIAL SHIPMENTS

1921	1922
142,003 cases	185,660 cases

COMPARATIVE STATEMENT OF LOCAL SHIPMENTS

1921	1922
34,463 cases	59,361 cases

COMPARATIVE STATEMENT OF EXPORT SHIPMENTS

1921	1922
146,233 cases	114,752 cases

TABLE 4

EXPORTS BY PROVINCES

Ontario.....	69,560 cases
Quebec.....	21,564 "
Nova Scotia.....	418 "
Prince Edward Island.....	9,329 "
Manitoba.....	5,580 "
Saskatchewan.....	4,777 "
Alberta.....	2,500 "
British Columbia.....	1,024 "
Total.....	114,752 "

TABLE 5

CLASSIFICATION OF EXPORTS

Fresh eggs.....	22,751 cases
Storage eggs.....	92,001 "
Total.....	114,752 cases

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For the calendar year, 1922, 1,138 inspections were made covering a total of 359,302 cases of eggs. Of these, 114,752 cases were exported to Great Britain, and of this quantity 22,751 cases were fresh and 92,001 cases were storage. There was a slight falling off in the exportation of Canadian eggs during the past year as compared with 1921, due to market conditions during the early part of the season when quotations from British importers precluded exportation of Canadian fresh eggs at a profit.

During the year, a pronounced increase is noticeable in intraprovincial or voluntary inspection. This increase would indicate a growing tendency on the part of produce dealers, packers, track shippers and country dealers to sell on a graded basis subject to Government inspection, thereby applying the principle of quality payment and recognizing the principle that the system of Government inspection is absolutely impartial, safeguarding the interest of buyer and seller alike. The method of inspection is highly commended by practically every British importer, and it is owing to the efficiency of the system and the ability of the inspectors employed that Canadian eggs are receiving a premium on the British market over the product of our nearest competitor. The standards for Canadian eggs based on the interior quality of the product makes possible the shipment of a grade of eggs of a definite quality, and quoting from Dr. Grisdale's statement concerning the development of Canada's export trade in agricultural products:—

“When it comes to eggs, Canada ranks highest, next to the home article or the Holland article, which, of course, comes over inside twenty-four hours. Thirty-dozen crates, ‘Canada Firsts,’ were quoted some shilings higher than American selected eggs, Americans being, of course, our greatest competitors.”

Attention has been directed during the past year to a close analysis of conditions under which eggs are being offered to the consuming public, to ascertain why it is consumers have experienced so much difficulty and unpleasantness in the purchase of eggs. Reports are on file covering upwards of 3,000 retail stores in the principal consuming centres of Canada. Low grade, bad and musty eggs were found to be the principal factors retarding home consumption. The importation of low grade foreign eggs proved to be, on investigation, a serious contributing factor in curtailing home consumption. A conference was held with representatives of the wholesale trade, Retail Merchants' Association, producers and consumers to consider the question, resulting in strong representations being made that drastic action should be taken to place some restrictions on the importation of foreign eggs of low grade quality. Following these representations, regulations were promulgated covering the importation of foreign eggs which became operative October 7, 1922. Since the Import Regulations came into effect, October 7 to the end of the calendar year, 154 carloads of United States eggs were imported, representing 61,334 cases. Of this quantity, Toronto alone imported 76 carloads or 30,286 cases. Reports show that the quality of imported eggs arriving from the United States is much better than importations previous to the operation of the regulations.

Realizing that the home market is Canada's greatest market, attention is being directed to encouraging the purchase and sale of eggs on a quality basis graded in accordance with the Canadian standards and making available for the consumer eggs of a definite quality. The principle has been accepted and it only remains to be applied in actual practice in such a manner that will ensure a fair deal to all concerned in the marketing of the product. With this end in view, amendments to the Egg Regulations are being given consideration which will more effectively develop the home market, giving proper consideration to the three parties vitally interested, first the consumer, which represents the largest

interest and an interest that must be carefully safeguarded, second, the producer who must receive compensation on an equitable basis that will ensure an increased interest in the production and marketing of a quality product, third, the whole-sale produce merchant as a factor in the proper distribution of the product through well ordered channels of trade. The effect of the proposed regulations, it is confidently believed will further stabilize the egg industry with the result that the country merchant, who is probably the largest collector, will have every incentive to market his eggs promptly. Consequently there will be a decreased supply of low grade eggs and a correspondingly increased supply of high grade eggs which will materially lower the price to the consumer and stimulate a heavy increase in consumption, thereby improving the greatest market we have for the product—the home market.

RECORD OF PERFORMANCE FOR POULTRY

This project, which has been in effect since 1919, consists of the official inspection and subsequent certification of trapnest records of pure-bred birds on the owners' premises. Its operation is based on two fundamentals—the ability of the inspectors to estimate the past production of individual birds from their physical condition, and the fact that future production can be predicted from the known production during a certain period early in the laying year. A good indication that the control thus established is effective against attempts on the part of the breeders to "pad" their reports of production is the fact that, taking the three years in which the work has been carried on, the total percentage of birds qualifying for certificates is 36 per cent, as against approximately 50 per cent in the ten official Canadian Laying Contests last year, where the birds were on Government plants and under neutral control.

Briefly, the objects of Record of Performance may be stated as follows:—

- (1) To encourage the breeding of poultry combining high production and standard qualities.
- (2) To secure for poultry breeders reliable information as to the sources of such stock.
- (3) To demonstrate to breeders the value of trap-nesting and pedigree breeding in building up high-producing strains of standard breeds of poultry.
- (4) To eliminate the advertising of high trap-nest records of doubtful authenticity.
- (5) To assist breeders in becoming familiar with the most up-to-date methods of poultry breeding.

The work has increased steadily since its inception in 1919. In table (1) are given the comparative entries in 1919, 1920, 1921 and 1922.

TABLE 1

Province	1919		1920		1921		1922	
	Birds	Breeders	Birds	Breeders	Birds	Breeders	Birds	Breeders
British Columbia	1,625	10	2,488	16	2,580	25	6,208	67
Alberta.....	24	2	45	1	662	16	1,262	17
Saskatchewan..	120	1	363	3	418	5	250	4
Manitoba.....	203	3	25	1	214	5	311	8
Ontario.....	1,086	26	2,576	33	5,065	40	2,460	38
Quebec.....	869	8	1,503	16	2,065	18	1,175	30
New Brunswick...	180	4	400	7	275	4	325	4
Nova Scotia.....	83	2			190	4	175	3
Pr. Edward Island	246	11	111	4	110	5	120	4
Totals.....	4,436	67	7,511	81	11,579	122	12,286	175

It will be noted that the breeders in British Columbia have taken up this work in great numbers during the current year (1922-23). The progress in this province is even greater than appears on the surface, as the breeders in Record

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of Performance have organized a provincial association, called the Record of Performance Poultry Breeders' Association of British Columbia, of which every entrant in the province is a member. This Association is carrying on an active advertising campaign based on Record of Performance results, and reports that its members are sold out of eggs and baby chicks for the present season. Much of this business has come from the Petaluma district in California, where the poultrymen welcome the chance to secure certified stock in large numbers.

An organization similar to the above has also been formed in Alberta, and breeders in Ontario and Quebec have expressed a desire to do likewise.

A report is published each year, as early as possible in order to be available during the breeding season.

Much discussion takes place among poultrymen as to which is the "best breed" for egg production. In table (2) the results are tabulated by breeds, showing the percentages under the different headings. In this table no entries are included which were withdrawn or dropped during the year. The minimum qualification requirement for Record of Performance Certificate is 150 eggs or over, and for Record of Performance Advanced Certificate, 225 eggs or over, in fifty-two consecutive weeks.

TABLE 2

Breed	Entered	Banded	R.O.P. Certifi- cate	R.O.P. Advan. Cert.	With- drawn	Died	Failed to Qualify	Number of Entries
Wyandottes.....	755	741	317 42.6%	61 8.2%	146 19.6%	52 7%	168 22.6%	21
Leghorns	3,890	3,899	1,552 39.8%	334 8.6%	746 19.1%	349 9%	918 23.5%	37
Plymouth Rocks..	3,302	3,231	781 24.2%	105 3.2%	824 25.5%	467 14.5%	1,054 32.6%	43
Rhode Island Red	1,117	1,058	196 18.6%	11 1%	470 44.4%	83 7.8%	298 28.2%	21
Anconas.....	35	29	12 41.4%		4 13.8%	2 6.9%	11 37.9%	2
Other breeds	75	75	7 9.2%		49 65.4%	2 2.7%	17 22.7%	2
	9,174	9,036	2,865	511	2,239	955	2,466	126

The Wyandottes lead the Leghorns in percentage of total certificates by a small margin. This was also the case last year, and in the totals to date.

The success and value of this whole project rests entirely on the confidence of the breeders and buying public in the accuracy of the records. This confidence is maintained by rigid inspection and careful checking of the breeders' reports in the office. In connection with the latter, it has been found possible to predict with a marked degree of accuracy, future production of groups of birds, using as a basis the known production for periods early in the year.

The value of the work is two-fold. It consists in the gathering and publishing of reliable information as to the sources of stock of known high-producing qualities, and in the missionary work done by the inspectors in the course of their duties, in regard to improved methods of breeding, pedigreeing, feeding, housing, etc. This latter phase of the work is having its most marked effect in districts where poultry keeping was heretofore run in a rather haphazard manner.

Another feature of Record of Performance is the fact that a much greater number of birds can be handled than in any other way. In other words, it can be readily adapted to meet the needs of the industry in sufficient volume to have a definite effect in poultry breeding in a national way.

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EGG AND POULTRY MARKETS INTELLIGENCE

No change has been made during the past year in the system of distributing markets intelligence. Through the medium of the Canadian Press, daily market wires covering the egg and poultry situation throughout Canada, the United States, and Great Britain, appear in the daily press in all parts of Canada. In the case of Ontario, many in the small towns are reached by mail, at the same time. The cost of this service is very small and particularly when considered from the standpoint of the number reached.

Some business houses and co-operative concerns look to this service for special daily and weekly reports and there is no doubt that this end of the work will increase.

The importance of the Chicago market as relating to the general situation in Canada is very apparent and the establishing of direct telegraphic communications with this market is being considered.

The weekly egg and poultry markets report is still being published. Requests are being received continually for this report and for market statistics which it is possible to compile from the weekly report.

The distribution of this report to British egg and poultry importing houses still continues and very cordial letters have been received respecting this particular work.

The method employed in gathering market information is the same as in previous years. All officers of the Poultry Division are expected to furnish daily reports on prices, receipts, etc., from points visited. In addition, special correspondents are maintained at Vancouver, Calgary, Edmonton, Regina, North Battleford, Montreal and St. John. The London, Liverpool, and Glasgow markets are reported weekly by cable.

With regard to the United States market information received, efforts are being made to establish definite market correspondents, particularly in Chicago and possibly New York and Boston. At the present time the Chicago and New York market information received, is obtained by the Toronto market correspondent. Very often a change takes place in the Chicago market around noon and through our present system, it is not possible to get information of that change until the next morning, hence it is at least a day late before it reaches those to whom the reports are distributed.

SHEEP AND SWINE DIVISION

Hog prices remained firm throughout the year enabling farmers to sell their hogs at a figure which netted a good margin of profit over cost of production. The depreciation in the price of grain in Western Canada caused farmers to turn to hog raising as a more profitable means of marketing their barley and oats with the result that production in the western provinces materially increased. Fortunately Quebec and Eastern Ontario which suffered from a drought the year previously had materially decreased their production of hogs and the surplus of hogs produced in the west found a good market in Montreal. The general type of Canadian hogs at the present time is of a quality unsuitable for the export market but owing to low production the bulk of our thick smooth hogs is being consumed in the Canadian trade. The farmers are now generally awake to the requirements of the British market and with the widespread sale of bacon type breeding stock it is expected that future expansion of the industry will provide a surplus of hogs of a type which will produce the best of Wiltshire bacon.

The liquidation of breeding ewes which occurred during the past two years has reduced lamb production to a point where the supply is scarcely equal to the demand. The general quality of Canadian lambs is undoubtedly improving and

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with lamb becoming more popular as a household meat the price has been maintained at a figure which is extremely remunerative to the sheep raiser. The price of wool has also gone up steadily and now that there is a general shortage the world over further advances are expected. With good prices for both wool and lambs interest in sheep raising is reviving and many farmers are now starting a small flock.

WOOL GRADING

Wool grading was again performed for all farmers who forwarded their wool for grading and co-operative sale. Although wool prices advanced considerably over last year, the keen competition which developed among local buyers in the purchase of wool direct from farmers at a flat price, resulted in a considerable falling off in the quantities forwarded for grading as compared with the previous year. It was noticeable, however, that this year the percentage of reject wools and inferior grades was much lower than a year ago, indicating that the best farmers continued to sell according to grade. The following tables show the total amounts forwarded by the various associations and by provinces:

WOOL GRADED, 1922

WOOL CONSIGNED BY ASSOCIATIONS

	Assn. Total	Prov. Total
<i>Prince Edward Island—</i>		
Prince Edward Island Sheep Breeders.....	35,755	35,755
<i>Nova Scotia—</i>		
Antigonish Wool Growers.....	24,102	
Truro Wool Growers.....	47,382	
		71,484
<i>New Brunswick—</i>		
New Brunswick Wool Growers.....	21,818	21,818
<i>Quebec—</i>		
Sherbrooke.....	11,451	
Pontiac.....	25,116	
Beauharnois.....	1,596	
Bedford.....	3,275	
Beauce.....	514	
Compton.....	8,611	
Argenteuil.....	2,864	
Richmond.....	5,345	
Ottawa.....	5,117	
Stanstead.....	8,109	
Sundry shipments.....	8,305	
		80,303
<i>Ontario—</i>		
Southern Manitoulin Wool Growers.....	13,624	
West Manitoulin Wool Growers.....	14,640	
Canadian Co-operative Wool Growers.....	630,048	
		658,312
<i>Manitoba—</i>		
Manitoba Branch.....	101,170	101,170
<i>Saskatchewan—</i>		
Canadian Co-operative Wool Growers.....	83,336	
Southern Saskatchewan Wool Growers.....	28,392	
Saskatchewan Branch.....	190,810	
Sundry shipments.....	2,823	
		305,361
<i>Alberta—</i>		
Central Alberta Wool Growers.....	16,865	
Alberta Provincial Sheep Breeders.....	71,098	
Alberta Sheep Breeders.....	99,978	
Southern Alberta Wool Growers.....	158,574	
Vermilion Wool Growers.....	46,573	
Canadian Co-operative Wool Growers.....	103,789	
Sarnia Ranching Company.....	31,099	
L.S.C.....	22,662	
		550,638
<i>British Columbia—</i>		
British Columbia Wool Growers.....	93,161	93,161
Grand total.....	(Lb.)	1,918,002

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CLASSES OF WOOL BY PROVINCES

<i>Eastern Domestic Wool—</i>	
Prince Edward Island.....	35,755
Nova Scotia.....	71,484
New Brunswick.....	21,818
Quebec.....	80,303
Ontario.....	658,312
	<hr/> 867,672
<i>Western Domestic Wool—</i>	
Manitoba.....	96,249
Saskatchewan.....	179,877
Alberta—	
Central Alberta Wool Growers.....	16,865
Alberta Provincial Wool Growers.....	67,137
Alberta Sheep Breeders.....	76,455
Southern Alberta Wool Growers.....	2,108
Vermilion Wool Growers.....	928
Canadian Co-operative Wool Growers.....	84,721
British Columbia.....	68,232
	<hr/> 592,572
<i>Western Range Wool—</i>	
Manitoba—	
Canadian Co-operative Wool Growers.....	4,921
Saskatchewan—	
Southern Saskatchewan.....	125,484
Alberta—	
Southern Alberta Wool Growers.....	156,466
Vermilion Wool Growers.....	45,645
Canadian Co-operative Wool Growers.....	19,068
Alberta Provincial Sheep Breeders.....	3,961
Alberta Sheep Breeders.....	23,523
Sarnia Ranching Co.....	31,099
L.S.C.....	22,662
British Columbia.....	24,929
	<hr/> 457,758
Grand total.....	<hr/> 1,918,002

RAM CLUBS

Extensive work in the organization of Ram Clubs was again undertaken during the past year. In Quebec, upwards of thirty clubs were organized and one thousand head of purebred rams were purchased by agents for sale to farmers. The demand created for rams through this organization work, soon depleted the available supply in Quebec and several hundred head had to be purchased in Ontario, and the market which this provided for Ontario breeders, practically took care of all saleable stock of reasonably good quality in that province. The organization of Ram Clubs is being confined to counties where very little purebred blood has been used and when once a county is entered, an effort is made to effect sufficient sales to insure the use of purebred rams with the majority of farmers. This makes available for market, the following season, several carloads of improved type market lambs thus enabling farmers to estimate clearly the value of the use of the purebred sire in dollars and cents. There are still many districts in Eastern Canada as well as the West, where further organization work of this nature can be promoted and it is proposed to cover as many of these districts as possible during the coming season.

THE RAM PREMIUM POLICY

This policy has been the means of encouraging many farmers to buy a good purebred ram. Under the conditions of the policy, two annual premiums of \$5 each are paid to any farmer who purchases a purebred ram for the first time and who agrees to dock and castrate his lambs. During the past year when money was scarce this policy has done much to maintain the use of

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purebred rams, especially among the indifferent flock owners who have never appreciated the importance of using a purebred ram in preference to a grade. The policy especially when operated in conjunction with the organization of ram clubs has been very effective in generalizing the practice of docking and castrating the lamb crop.

The following table gives the number of applications for premiums received from each province, intimating also the breed of rams purchased.

FIRST ANNUAL PREMIUM PAID, 1922

Breed	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Hampshire..	1	4		42	5				.....
Shropshire.....	1	18	10	266	74	2		3	.....
Oxford.....	3	29	39	234	91	5		2	3
South Down ...		1			2				
Cheviot....		1	3	33					4
Leicester.....	1		6	93	14				..
Cotswold.....				1	3				..
Suffolk.....								2	..
Lincoln.....									
Dorset.....		1	4		1				
Total.....	6	54	62	669	190	7		7	7

Total.....1,002

SECOND ANNUAL PREMIUM PAID, 1922

Breed	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B C.
Hampshire..	1	2		35	7				.....
Shropshire.....		19	4	71	38				.....
Oxford.....	3	28	17	143	35	1		5	1
South Down.....		1		2	2				.....
Cheviot....				2					.....
Leicester.....	2	2	4	42	11	1			.....
Cotswold.....									.....
Suffolk.....					1		2		.....
Lincoln.....	1		1						.....
Dorset Horn			1						.....
Total.....	7	52	27	295	94	2	2	5	1

Total..... 485

GRADING OF PUREBRED RAMS

Ram grading was performed during the past season in the provinces of Alberta, Manitoba, Quebec, New Brunswick and Nova Scotia. In Quebec and the Maritime Provinces, where the work has been continued for a number of years, the sale of purebred rams by breeders has been greatly facilitated and the confidence of the grade flock owner in the use of a purebred sire has materially improved. In Western Canada, where grading is a new feature of sheep improvement work, it is looked upon with favour both by breeders and buyers as it assists in sale and purchase by mail. Breeders invariably follow the practice of selling their X rams to the butcher and offer only XXX and XX rams for breeding purposes. Ram grading has tended to eliminate the scrub purebred ram in the provinces where grading has been done and is also doing much to improve the general type of the pure-bred flocks.

DIPPING, DOCKING AND CASTRATING

The practical value of these operations, which have been demonstrated to sheep raisers through our field work during the past number of years, is becoming more appreciated and their adoption has been more general. A most illustrative method of demonstrating the value of these practices was originated this year in Ontario where field work in this connection was limited to a few counties and where car-lots were marketed co-operatively in the fall. These straight car-lots of ewe-lambs and wethers brought prices ranging from one to two cents a pound higher than top quotations for the day.

The placing of pure bred rams in the province of Quebec under our bonus policy, has necessarily increased requests for demonstrations and as a result there is a marked decrease in the percentage of ram lambs offered on the Montreal market.

The following is a summary of activities in the above connection:—

Province	Number demon- strations	Attendance	Number of Meetings	Attendance	Number of Sheep Dipped	Number of lambs docked and Castrated
New Brunswick and Nova Scotia.....	15	300	67	2,700	1,400	3,000
Prince Edward Island.....	16	733	20	1,628	500	300
Quebec.....	50	1,000	300	60,000	7,500	8,000
Ontario.....	30	500	35	1,621	6,400	1,650
Manitoba.....	15	300	.....	.....	.....	.....

A special feature of the dipping work in Ontario has been the establishment of the community dipping tank. Eight of these were installed during the past season and from the requests received for tanks of this kind, it is anticipated that a large number may be installed during the coming season. The community dipping tank provides permanent facilities for annual community dipping with a minimum cost to each sheep raiser and the general use of these tanks will mean increased comfort to flocks and greater revenue to the farmer.

CO-OPERATIVE SHEEP AND LAMB MARKETING

Co-operative marketing of lambs especially in the Maritime Provinces and Quebec did much to maintain a relatively high average price to sheep raisers in these provinces and more particularly in districts farthest removed from marketing centres. Local buyers early in the season, predicted a lowering of prices, especially as the McCumber Fordney Tariff bill was likely to be made applicable at a time when the bulk of the fall offerings were ready for market. The encouragement of co-operative shipments, however, demonstrated that the tone of the market was strong and a well organized distribution of co-operative shipments to the large market centres was largely instrumental in maintaining prices at a relatively high average throughout the entire season. Co-operative shipments in Ontario and Manitoba also demonstrated that a very considerable saving could be effected by marketing co-operatively. The following table gives a summary of co-operative shipments by provinces:—

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SUMMARY OF CO-OPERATIVE MARKETING

LAMBS

Province	Number of Cars	Number of Head	Value
Prince Edward Island.....	14	1,999	\$15,918 06
New Brunswick.....	15	1,843	12,300 83
Nova Scotia.....	4	457	2,853 67
Quebec.....	68	7,000	49,000 00
Ontario.....	10	1,027	8,800 00
Manitoba.....	6	650	.....

SHEEP FEEDING COMPETITIONS

These competitions which have as their object the encouragement of better feeding and management of the farm flocks, were organized only in the province of Quebec, in co-operation with the Quebec Department of Agriculture.

It was found that farmers who were purchasing purebred rams for the first time, were often lacking in a knowledge of modern sheep practice. In many cases the sheep barns required adjustments in order that the flocks would be comfortably housed; proper equipment including suitable feeding racks, was often lacking and in numerous instances, suitable forage crops for summer feeding of ewes and fattening of lambs for market, were not being grown. Furthermore, it was found that the winter ration fed to breeding ewes often lacked variety or was not being properly balanced to induce the wintering of ewes in such a condition that they would produce strong, healthy lambs, as well as an adequate milk flow after lambing.

Inspectors in making the awards, considered the buildings; equipment; uniformity of flock; condition of ewes and ram; feeds and methods of feeding; use of forage crops; weight and quality of wool clip and weight and quality of lambs marketed. As far as possible, flock management and flock improvement were discussed with each farmer who entered the competition. Assistance as necessary, was given in the docking and castrating of the lambs.

Thirty-three of these competitions were held in the province and as a result of inspections made many flocks have been culled of undesirable ewes, improved feeding racks have been built, proper roughages are being grown and farmers will market wool of a superior quality and lambs of a more desirable market type.

LAMB SHOWS AND SALES

The success attained at the first lamb show and sale held in Canada at St. George, Beauce county, Quebec, 1921, where extensive work had been done in the placing of purebred rams, as well as the carrying on of a large amount of demonstration work in the dipping, docking and castrating of lambs, made it appear advisable to extend these fairs and sales to other sections of the country where similar breed improvement work had been carried on. At each fair the grading of the lambs offered according to market requirements was made a special feature and sales were made on the graded basis.

The purpose of these lamb shows and sales is to demonstrate the value of the purebred sire in the production of high grade market lambs, and also to demonstrate that well finished lambs of improved breeding, which have been dipped and docked and the males castrated, will bring a premium on the market when offered for sale in carload lots.

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The prizes offered have been made sufficiently attractive to bring out a large number of entries, thus providing an excellent opportunity for farmers in a community to study the respective merits of the progeny of well graded flocks from different rams of the same breed, as well as rams of different breeds. The judging of the various classes is a means of educating the farmer to lamb market requirements and grading; and sale according to grade, which has been made an important feature of each fair, enables the farmer to see in actual dollars and cents what type of lamb is the best seller.

Entries have been confined to lambs that are the progeny of purebred rams and which have been properly prepared for market. Fairs are only held in districts that give promise of providing at least three hundred lambs for the fair. The sale of the lambs when judging has been completed, is left in the hands of a Sales Committee. In some cases the committees encouraged buyers to attend the fairs and with a view to purchasing locally by public auction, whereas in other cases at the wish of the owners, the lambs were consigned by the committee as a co-operative shipment for sale at the stockyards. These fairs provided a measure of organized salesmanship in the districts in which they were held, with the result that the prices obtained for lambs exhibited at these sales, were in a measure maintained for the remainder of the lambs of the district.

The Provincial Department of Agriculture for Quebec co-operated with the Dominion Department of Agriculture in providing fifty per cent of the prize money and expenses, and nineteen fairs were held in the province, at which seven thousand lambs were exhibited and sold. In Ontario, fairs were held at Chatsworth, Middleville and Paris, at which seven hundred and fifty lambs were exhibited and sold. At Arbourg in Manitoba, perhaps one of the outstanding fairs of the year was held; there being a total of six hundred and fifty head of lambs entered for show and sale. It is estimated that this sale alone was instrumental in effecting a gain of some two thousand dollars to the exhibitors in the sale of their lambs.

These sheep sales have undoubtedly been a big factor in promoting the greater use of purebred rams and give promise of being extremely useful in stimulating greater interest in sheep raising, providing a proper medium for the sale of quality lambs and a means of securing the market premium for well finished stock of the right breeding.

GOAT EXTENSION WORK

Considerable interest is being developed in the breeding of goats in Ontario and Alberta. A series of demonstrations were conducted during the summer months on suburban areas of central Ontario. Several does of milking breeds were conveyed from place to place in an auto truck which was fitted up for the purpose. Signs setting forth the good qualities of milk goats were displayed and at each demonstration point, the does were milked and those who attended the meetings, were allowed to sample the milk. As a result of this publicity work, there arose a very considerable demand for milking does, and although there are a considerable number of breeders in the province, there were not nearly enough animals offered for sale to meet the requirements. If such demonstration work is carried on another year, it would appear advisable to make special provision for the importation of a carload of moderately priced milking does.

RAM DISTRIBUTION POLICY

The loaning of rams under this policy has been further restricted in scope during the past year. The encouragement given to individual purchase through

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the ram premium policy and the efforts of our field men in organizing ram clubs, has largely eliminated the necessity for loaning rams to associations and as a result any loans which were approved were made in newly settled districts or in districts settled by returned soldiers.

The following table shows the number of rams loaned at present in each province:—

Province	Oxfords	Shrop-shires	Leices-ters	Hamp-shires	Lincolns	Total
Quebec	20	20		8		48
Ontario ..	10	6	3		2	21
Manitoba	29	1				30
Saskatchewan.....	1					1
Alberta.....	9	6	1			16
British Columbia.....	2					2
	71	33	4	8	2	118

BOAR DISTRIBUTION POLICY

In view of the special effort being made during the year to encourage the raising of bacon hogs, there has been a large number of requests for the loan of bacon type boars by Boys' and Girls' Swine Clubs and associations of farmers in districts where no purebred bacon type boars were available. At the present time a total of one hundred and ten boars are out on loan under the policy.

SHORT COURSES AND LECTURES

A series of sheep and swine marketing courses and lectures dealing with sheep and swine marketing problems were given in practically all the provinces. The Swine Conference at which a definite policy with regard to hog grading was drafted, necessitated the undertaking of a large amount of special field work in swine, dealing with the proposed basis of hog grading, the holding of hog grading demonstrations at local shipping points, and demonstrations setting forth the grading of Canadian bacon for export. The judging of live hogs and dressed carcasses was made a special feature of the swine marketing courses, and two sides, one from a select bacon hog and the other from a thick-smooth type were cut up, one into a Wiltshire side for export and the other into the usual Canadian cuts. The swine marketing courses, hog grading demonstrations, and lectures on hog marketing, did a great deal to impress on farmers the necessity of breeding bacon hogs.

At the sheep marketing courses, wool grading and co-operative selling of wool were dealt with, indicating where improvement in the quality and grade of wool could be improved in the various provinces. Judging market lambs and the cutting up of lamb carcasses for lamb rings and retail purposes was demonstrated and had as its objective, increased consumption of lamb in Canada. Sheep improvement topics, such as dipping, docking and castration, problems in co-operative marketing of lambs, organization of ram clubs, flock culling and feeding and management of the farm flock, were covered in detail. These courses are doing much to stimulate interest in sheep raising generally throughout the various provinces.

BOYS' AND GIRLS' SWINE CLUBS

The organization of Boys' and Girls' Swine Clubs was extended during the year to every province in the Dominion and a total of 121 clubs organized and made operative during the year. Our field men co-operating with the provincial

district field men supervised the selection and purchase of good breeding stock for many of the clubs, this assistance approximating a total of one thousand head of pigs. Members of a number of clubs that were organized a year ago are now breeding excellent type brood sows and next spring will have quantities of stock available for sale to newly organized clubs. The province of Manitoba is perhaps further advanced in this connection than any of the other provinces. In addition to assisting in the selection of desirable stock for club members the division issued monthly letters dealing with the feeding and finishing of bacon hogs.

The success attained by the club members on the whole in the feeding of their pigs during the summer enabled the clubs to make an excellent exhibit of hogs at the local county or school fair. The quality and type of the stock proved a splendid educational feature not only to members but also to the parents.

The marketing of the carlot entries by the clubs in the various provinces at stockyard centres stirred up keen rivalry between the clubs and members who were fortunate enough to go to the marketing points to see the carlots judged and participate in the swine judging. Competitors derived much valuable information which will be of future value in the breeding and marketing of hogs.

The various carlot entries were graded in accordance with the official hog grading standards and the boys clearly demonstrated their ability to produce properly finished hogs of the proper type. The marketing of straight carloads of hogs of uniform breeding enabled the clubs to sell their hogs, especially when they were properly finished, at a handsome premium over going market prices. The success which has attended the efforts of club members in the production of bacon hogs has been the means of introducing the breeding and production of bacon hogs as a general policy in many districts where previously the farmers were breeding nondescript hogs of non-bacon type. The following table shows the number of clubs organized in each province, the membership and the number of hogs marketed:—

LOCAL COMPETITIONS

Province	Number of Clubs	Entries	Amount in Prizes	L.S.B. paying one-third
Quebec.....	54	1,200	\$ 9,000 00	\$ 3,000 00
Ontario.....	11	107	423 00	141 00
Prince Edward Island.....	7	85	399 00	133 00
Nova Scotia.....	1	...	...	...
New Brunswick.....	2	35	360 00	120 00
Manitoba.....	30	277	1,743 00	581 00
Alberta.....	8	160	358 00	119 34
British Columbia.....	8	120	961 00	320 33

CARLOT COMPETITIONS

Province	• Number of Carlots	Number of Hogs	Price	Amount in Prizes paid by L.S.B.
Prince Edward Island.....	3	280	9-11	\$ 270 00
Nova Scotia.....	1	60	...	...
New Brunswick.....	1	70	...	...
Quebec.....	50	3,795	9½-12	1,660 00
Ontario.....	8	480	10-14	595 00
Manitoba.....	10	700	9-11	595 00
Alberta.....	7	400	8-11	425 00
British Columbia.....	8	420	9-11½	410 00

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SWINE CLUB JUDGING COMPETITIONS

Province	Number Entries	Amount in Prizes	L.S.B. pays all
Quebec.....	185	\$ 1,400 00	\$ 1,400 00
Ontario.....	65	325 00	325 00
New Brunswick..	30	325 00	325 00
Manitoba.....	55	325 00	325 00
Alberta.....	40	325 00	325 00
British Columbia	35	325 00	325 00

HOG GRADING

The Swine Conference held in November of 1921, was called for the purpose of analyzing the swine industry in Canada with a view to developing a policy which would give stimulus to the production of better quality hogs and provide for a safe expansion of the industry. The Conference which was composed of delegates representing producers, packers, Provincial Governments and the Federal Government, after much deliberation, recommended a plan for the marketing of hogs on a graded basis. The Live Stock Branch of the Federal Department of Agriculture was charged with the responsibility of drafting hog grading regulations embodying the recommendations made at the conference and at once proceeded to study the situation from all angles in order that the new regulations when finally passed would be generally applicable in all provinces and for all stockyards. This required time and necessitated repeated consultation with producers' organizations, live stock exchanges, stockyard companies and packers, but finally agreement was reached on the various contentious points of issue and the draft of regulations, approved by all interested parties, was submitted to Council and, being subsequently passed, became effective on October 30, 1922.

During the period which elapsed while the regulations were being drafted, the department augmented the usual staff of field men and a large number of hog grading demonstrations were held at shipping points and in connection with swine marketing courses. Special lectures on the bacon hog and hog grading were also delivered at meetings throughout the country. This educational work did much to acquaint farmers with hog grading and its application besides creating a general appreciation of the benefits accruing from the breeding of bacon type hogs. It also had the effect of inducing a large number of farmers to buy breeding stock of improved type and popularized the use of bacon type boars, thus tending to increase greatly the number of select bacon hogs produced in the country.

As soon as the grading regulations went into effect and all hogs marketed were graded it became apparent that only a very small percentage of Canadian hogs were grading select bacon. Grading had the immediate effect of reducing the percentages of overweight hogs and the premium paid for selects had the effect of stimulating farmers to greater effort in the breeding and finishing of select bacon hogs. The following statement shows the percentages of each grade of hogs at the various stockyards.

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TABLE SHOWING PERCENTAGES OF VARIOUS GRADES AT STOCK YARDS OCTOBER 30, 1922, TO FEBRUARY 28, 1923, INCLUSIVE

Market		Selects	Thick Smooth	Heavies	Extra Heavies	Shop Hogs	Lights and Fee lers	Roughs	Sows No. 1	Sows No. 2	Stags
Toronto		20.3	54.7	12.9	0.3	8.5	1.4	0.07	0.2	1.1	0.1
Montreal...		18.6	38.2	3.5	0.2	31.08	4.3	0.5	1.03	2.05	0.2
Winnipeg...		8.7	66.4	7.3	0.6	4.3	10.5	0.03	0.7	0.9	0.1
Calgary		2.8	75.9	2.0	0.3	10.6	6.4	0.06	1.09	0.6	0.08
Edmonton..		2.7	66.3	1.1	0.1	21.4	6.2	0.48	1.1	0.6	0.06
Total..	100%	12.2%	60.3%	7%	0.4%	13%	5.7%	0.2%	0.7%	1.1%	0.1%

72.5% within bacon weights.
7.4% over bacon weights.
18.7% under bacon weights.
2.1% all other grades and weights.

It will be noted that the percentage of select bacon hogs for the Dominion is only 12.2 per cent, whereas the percentage of thick smooth hogs is 60.3 per cent. The low percentage of select bacon hogs in Western Canada is attributable to the fact that in the western provinces the lard breeds gained a much greater foothold than in Eastern Canada. The effect of the widespread distribution of bacon type sows and more general use of bacon boars has not yet made itself felt to any appreciable extent on the percentage of select hogs being shipped to market although the effects of improved blood will be much more in evidence in a year's time.

Hog graders are operating at all stockyards throughout the Dominion and grading is supervised at all the principal packing plants. Commercial hog tags have been devised and are available for purchase in all the provinces, thus permitting of the proper marking of individual farmer's hogs and providing a definite means whereby farmers may get correct information on the actual grading of their shipments to market. Owing to the short time in which hog grading has been in effect it is impossible to estimate fully the results which have been attained, however, it is freely admitted by both packers and producers that hog grading has already done much to revolutionize the quality of Canadian hogs and that its continuance will place Canada in a position where she can safely expand her hog production, knowing that Canadian Wiltshire will be of a sufficiently high quality to meet the keenest competition on the world's markets.

BACON GRADING INVESTIGATIONAL WORK

The recent appointment of a bacon expert has made it possible to commence an analysis of the manufacture of Wiltshire sides in Canada, looking to the grading, curing, packing and selling of this product. The extent of the Canadian trade in pork products and the fact that a very considerable percentage of our bacon hogs are utilized, especially in the manufacture of the cured Canadian cuts, suggests the necessity of making a careful study of the whole Canadian trade in fresh and cured pork products, in order that a definite relationship may be established between the purchase of live hogs on a graded basis and the disposition of the carcasses from these graded hogs through the various wholesale and retail channels. It is hoped that sufficient information will be secured in the course of a year to permit of making fairly definite recommendations in regard to the grading of bacon for export and the grading of pork cuts for sale in Canada.

BACON PRODUCTION TEST WORK

Realizing the necessity of definitely relating breed type and conformation in purebreds to the requirements and standards of choice Wiltshire sides, pre-

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liminary test work was arranged for with a number of purebred breeders and twelve pairs of hogs of Yorkshire, Tamworth and Berkshire breeding were fed at the Central Experimental Farm, Ottawa, and four pairs of Yorkshires and Tamworths were fed at the Experimental Farm, Charlottetown, P.E.I. A careful record of all feeds consumed was kept by the Experimental Farms Branch so that definite figures were obtained with regard to production costs for each pair of pigs submitted by each breeder. When finished at proper weights, the hogs were slaughtered and the carcasses converted into Wiltshire sides, a record being kept of the percentage of dressed weight and the percentage of trim. The sides were then scored, taking into consideration, firmness and distribution of back fat; length and proportion of side; distribution of lean meat; fullness and shape of ham and smoothness of shoulder. The test indicated that there was a considerable difference in the feeding qualities of the different strains within the various bacon breeds and also that certain strains were capable of producing superior Wiltshire sides to others. The information obtained will be used to develop a definite policy whereby it is hoped that a definite test will be applied to purebreds for the purpose of estimating their ability to produce pork economically and high grade Wiltshire sides.

ENCOURAGING SALE OF BACON TYPE SOWS AND BOARS TO FARMERS

The institution of hog grading created a general demand for bacon type sows and the various field men all over the Dominion were active in assisting farmers to make the proper selections. In Quebec there was a general scarcity of bacon type sows and seven hundred and fifty-seven head were purchased in Ontario and shipped for sale direct to farmers in various parts of the province. In addition some three hundred and eighteen head were purchased and sold within the province. In Ontario many sows of good type were selected with the advice of graders at local shipping points. In Alberta, 42 Yorkshire gilts were purchased and sold to Vermilion Club members, in addition to sales of Yorkshire sows to a number of districts settled by Ukrainian settlers. In every case where good type sows were purchased the farmers were advised as to the advisability of using good type boars with the result that clubs where improved type sows are being bred are practically all using bacon type boars. The effects of this breed improvement work is not as yet making itself felt in any large degree on the quality of hogs sent to market, but the effects will be quite general within a year. In fact hogs marketed this fall from sections of the Peace River District, Alberta, where upwards of two hundred head of bacon type breeding stock, mostly boars, had been placed a year ago, were grading an average of twenty-seven per cent select bacon hogs, whereas the average of hogs from other parts of the province was less than four per cent.

MARKETS INTELLIGENCE AND STOCK YARDS SERVICE DIVISION

During the past five years, services to the live stock industry, supplied through the Markets Intelligence and Stock Yards Service Division activities, have been successful to a marked degree in improving the conditions under which the live stock surplus of Canada is marketed.

This service aims to promote efficient and intelligent marketing on the part of the producer, and as well, to regulate and improve the services through which the farmers' stock is bought and sold on public stock yards, in all provinces of the Dominion. Confidence thus promoted, is resulting in a more steady tone to production and a stimulation of interest in the marketing of a better type of commercial animal.

Nothing will do more to inspire confidence in production and marketing than a thorough knowledge of the business of marketing, fair marketing costs, equal opportunities for all in purchase and sale, and accurate, disinterested and timely information as to the live stock market situation; all of which facilities are provided through this service. These facilities tend to safeguard against abnormal market situations, by promoting intelligent liquidation and a preponderance of the more marketable types of live stock. Only through a special organization, the personnel of which is in constant, intimate and sympathetic touch with the whole live stock market situation, is it possible to carry out the intent of the markets policy.

The Live Stock and Live Stock Products Act, 1917, providing for Federal control of Stock Yards, is the authority under which the Stock Yards Service operates. Regulations under the Act are enforced under the direction of the Chief of the Stock Yards Service, through officers of the Live Stock Branch stationed at the Public Stock Yards at Montreal, Toronto, Winnipeg, Moose Jaw, Prince Albert, Calgary and Edmonton. The markets publicity phase is provided through the stock yards officers and their assistants in conjunction with the Markets Intelligence Service staff in the Live Stock Branch at Ottawa.

During the past year approximately 865,000 cattle, 265,000 calves, 800,000 hogs and 590,000 sheep, roughly valued at \$35,000,000 on cattle, \$2,250,000 on calves, \$14,300,000 on hogs and \$3,500,000 on sheep and lambs, a total of \$54,750,000, were sold at the stock yards under conditions supervised by the officers of the Branch. All the above stock, besides passing under the supervision of the stock yards agents, has also been checked and recorded as to point of origin, sale and disposition, so that the Department may on the basis of that and previous information, build up a reliable record of live stock output.

ACTIVITIES DURING 1922

The activities of this service during the past fiscal year and since its inception, were as follows:—

The enforcement of regulations made under the Live Stock Products Act, 1917, and first effective in August, 1918, has resulted in the bonding of all commission men, operating on public stock yards, the organization and reorganization of live stock exchanges, the elimination of undesirable traders and practices on the yards, the standardization and approval of the rules and regulations under which live stock exchanges operate; standardization of all charges made on the yards by the stock yards company or by commission men, improvements in the accommodation for live stock, and the regulating of the quality and charges on feed supplied by the stock yards companies.

One of the most important regulations provides that all weigh scales at stock yards used in the weighing of commercial live stock, shall be equipped with a type-registering beam so that buyer and seller shall be supplied with official and accurate record of the weights of all commercial live stock sold over the scales. The application of this regulation permanently removes the source of much dissatisfaction among buyers and sellers, in placing weights beyond any question of doubt as to their accuracy, and if disputes arise, provides a sound basis on which to settle the same.

The operation of a stock yard includes the charge for service and supplies, such as loading, unloading, hay, straw and meal, weighing, etc. The charges for these are subject to the approval of the Department, and when submitted for approval as required under the Act, are given the most careful attention, and whatever rates are allowed are considered by the Department to be fair operating costs and in line with reasonable returns for services rendered. Each stock yard

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company submits a monthly statement of original cost of feed, selling cost and gross profit per unit.

The relative charges for feed as between the various yards, varies according to purchase price, the cost of operation, including labour and capital invested. It is understood of course that feed charges include the services of the men employed by the stock yards companies in the actual feeding and watering of the stock, the cost varying, according to the market for labour and supplies.

In order to prevent overcharges on live stock consignments or purchases, all exchanges are required to submit their schedule of selling and buying charges to the Department for approval and no changes or modification may be made in the schedule until such has been approved by the Minister. Strict regulations are laid down by the exchanges, as regards the rendering of accounts of purchase or sale, and every scale ticket issued must represent a bona-fide sale and bear the price and name of the owner and purchaser of the live stock represented. Account sales to shippers must be made and settled within forty-eight hours from time of transaction.

It is at once apparent that the effective elimination of questionable methods in the purchase and sale of live stock, through the co-operation of the exchanges with the Department of Agriculture has tended to return to the owner of the stock, a larger share of the proceeds of the final sales than otherwise would be the case. In effect, the overhead is reduced by the elimination of unjust charges and prices are stimulated through encouraging the fullest competition the market may offer.

The reasonable attitude being taken by the yard companies toward the regulations in the realization of the constructive force behind the same, and the general evidence of a desire to co-operate with the Branch in the work of conforming conditions to the requirements under the Act, is resulting in very satisfactory progress towards efficient service.

The Branch, through this Division is now endeavouring to develop a form of trust account for the live stock commission houses at stock yards, with the primary object of protecting the industry against financial losses, so as to promote the commission business to a higher plane than formerly.

The stock yards agents have recently extended their activities toward promoting familiarity with required market types of live stock. On request, the agents address meetings, pay visits to farms for the purpose of grading the stock into the various classes and commenting on the commercial value of each, and, as well, encourage the clearance of unsuitable feeding stock and the purchase of that of good feeding type and quality.

CONSERVATION POLICIES

The stock yards agents and their assistants have charge of the detail of the Free Freight and Carlot policies of the Department. It is conceded that the benefits derived by the live stock industry, particularly in the western provinces, from the operation of these two policies, have been particularly satisfactory. Under the Free Freight policy, thousands of good breeding females have been saved from slaughter and returned to the farm, to form the nucleus of, or addition to, the breeding herd. The terms of this policy allow free freight on heifers purchased by bona-fide farmers, for breeding purposes.

Under the Carlot policy, stimulation is given to the little enough practised art of winter feeding and to the utilizing of unoccupied pasturage for grass feeding. Bona-fide farmers wishing to purchase a car lot of feeding cattle at their nearest public stock yards are allowed free transportation and reasonable

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living expenses. In this way a large number of unfinished cattle which would otherwise be sold and butchered as common steers, are turned into choice butcher stock, and thereby contribute to the net returns from the live stock industry. In connection with these policies, the stock yards agents are called upon to consider the merits of applications made and to provide advice and assistance in the actual purchasing of the cattle.

The administration of the policy whereby immature calves offered for sale on public stock yards are subject to condemnation is administered through the Live Stock Commissioner by the stock yards representatives. Suitable calves are allowed to be shipped for store purposes. This policy has been effective for a number of years and has resulted in marked improvement of the quality in veal.

Work is now being undertaken in support of the new hog grading policy of the department. The Markets staff in the Branch is taking care of the records of grading and prices, paid on the new basis of graded sale. The trend of production and marketing is being interpreted from the records submitted by the official graders and statements on which to base practical and close-up publicity work are being prepared for the swine grading officers. The stock yards agents are assisting the graders in every way possible and are co-operating with the Swine Division in promoting satisfactory development of the work.

MARKETS INTELLIGENCE SERVICE

Having taken measures to provide every reasonable facility for the handling of live stock yards, the Branch has also undertaken to provide a source of market information that is absolutely unbiased, dependable and of a sufficiently analytical character to indicate current market conditions without tendency to mislead.

The stock yards agents through whom the Department administers the Live Stock and Live Stock Products Act, as it applies to stock yards, function, as well, as the source through which up-to-date, unbiased markets information is gathered and distributed for producers and others who may benefit thereby. These officers and their assistants also obtain the detail of every sale of live stock made and on this first-hand information, coupled with an intimate knowledge of market conditions, telegraphic reports are distributed twice daily to all parts of Canada. The mass of statistical data procured is forwarded daily to Ottawa, where it is recorded and co-ordinated with comments on the general market situation, to form the basis of a detailed weekly review of actual conditions of supply and demand on all stock yards in Canada. On the basis of the accumulated statistics of sales, disposition, prices, origin of stock, etc., periodical reports are also produced and in conjunction with data on foreign markets, afford a comprehensive review of the whole live stock situation. In this way, conditions and prospects as relating to the production and marketing of live stock are interpreted for the benefit of the producers and others interested.

In addition, the Markets Intelligence staff at Ottawa devotes a considerable part of its time to compiling live stock and trade statistics for publication and on request, interprets specific conditions in the industry, and supplies the press with articles, news items and other information: all of which is essential to efficient expansion in the live stock industry. In addition to the information supplied as regards the domestic situation, the Branch also provides cable services in connection with the British market for Canadian cattle and bacon, the information obtained being distributed throughout the nine provinces by wire, mail and press.

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Through this service, Canadian shippers of live stock are kept in constant touch with the purchasers in the British Isles, the latter being given every encouragement to establish trade connections with our shippers. Many hundreds of inquiries as to store cattle prospects have been dealt with. Recently, the Live Stock Branch commenced a market news cable service distribution through the newspaper press of Great Britain, with the object of familiarizing the British graziers with the condition of the Canadian market for store cattle and stimulating exports thereby.

The Branch is also preparing to supply through this service a more extensive cable service on the store cattle market in Great Britain, and in other ways further to inform the Canadian producer, on the live stock and meat trade situation in the British Isles.

It is felt that the service as a whole is being well rounded out and is functioning to meet the needs of the live stock industry.

There has never been a time in which attention to marketing is more necessary than at present. Competition in the world's outlet for surplus live stock is more keen to-day than ever before. Only on the basis of economic production, economic marketing, and economic distribution of a high class product, can the Dominion expect to hold a prominent place in the British market and in other outlets for our surplus stock.

All branches of industry are to-day rightly concerned with the problems involved in the selling and distribution of merchandise, and the work of the Department in supervising stock yards activities and in producing an elaborate markets information service, represent in a practical way, its efforts to deal with these problems as they affect the live stock industry in Canada.

EXHIBITS AND PUBLICITY

During the past fiscal year exhibits covering the activities of the Branch have been shown at the following large exhibitions and shows: British Columbia—Vancouver, New Westminster, Victoria; Alberta—Calgary, Camrose, Edmonton, Red Deer, Lloydminster; Saskatchewan—Saskatoon, Regina, Paynton, Weyburn, Prince Albert, North Battleford; Manitoba—Brandon; Ontario—Toronto (Canadian National), Ottawa (Central Canada), London, Picton (Fall Show), Napanee, Hamilton (Poultry Show), Exeter, Richmond, Renfrew, Toronto (Royal Show), North Bay, Sudbury, Sault Ste. Marie, Simcoe, Picton (Poultry Show), Ottawa (Winter Fair), Chatham, Guelph, Essex, Hamilton (Corn Show), Middleville, Lindsay, Metcalfe, Paris, Petrolia, Smiths Falls, Almonte; Quebec—Valleyfield, Three Rivers, Sherbrooke (Fall Show), Quebec, Sherbrooke (Poultry Show); New Brunswick—St. John, St. Stephen; Nova Scotia—Yarmouth, Antigonish, Amherst, Glace Bay, Stellarton, Truro, Halifax, Oxford; Prince Edward Island—Charlottetown, Summerside.

Standardization, co-operative marketing, and economic production are the phases of the poultry work that have been featured. Applications for literature and requests for exhibits and demonstrations show this means of placing the general public in touch with work of the Branch is still very popular. There has been little or no cessation in the demand for candling appliances and it is anticipated as a result of the advertising campaign conducted some months ago that the interest of consumers in a graded article, and the demand for candling appliances will be larger this coming fiscal year than previously.

Following the work done last year, exhibit material has again been loaned to retailers and others for the purpose of making attractive window displays in connection with the sale of graded eggs. In some instances exhibits and candling demonstrations have been given and many hundreds of people have shown their interest in this phase of the work.

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The sheep and wool exhibits featured the value of the pure-bred ram in flock improvement, market grades of lambs, Canadian wool grades and Canadian made woollen goods. A special feature in wool exhibits was the section devoted to homespun fabrics. These goods, which were all made in Canadian homes, attracted a great deal of interest.

The bacon hog and its relation to Canada's swine industry was made a special feature of the swine exhibit section. The ten official hog grades were also outlined and illustrated with transparencies showing representative specimens of the various grades. The grading of Canadian bacon was also illustrated by transparencies showing Wiltshire sides of desirable and undesirable grades. The swine exhibit did much to acquaint the farmers with the relationship between live hog grades and the grading of Wiltshire bacon for export.

The scope of the exhibit work of the Branch was further extended during the year, through the addition of displays by the Horse Division, Cattle Division, and Markets Intelligence and Stock Yards Service Division.

The exhibit arranged by the Horse Division at the Royal Agricultural Show, Toronto, consisted of an elaborate photographic display, depicting the required types of commercial horses, hunters, jumpers, carriage pairs, saddle horses, ponies, etc. The photographs were specially produced from subjects chosen by officers of the Branch and enlarged for exhibition purposes. In addition a continuous moving picture service was provided. This film was of considerable educational value, as illustrating the performance of a collection of some of the best hunters and jumpers in the Dominion, as well as the methods adopted in training jumpers for show work. The exhibit as a whole proved of considerable value.

A convincing demonstration of the value of the pure-bred sire in the herd, was provided by the Cattle Division, for exhibit at the Royal Agricultural Show, through the medium of a photographic story, adequately titled.

The exhibit consisted of a series of excellent photographic enlargements of subjects specially chosen and photographed for the purpose. These were arranged in related sequence to illustrate the value of the pure-bred bull in the herd, whether on the western prairies or in eastern feed-lots. The chief attraction of this exhibit was a series of illustrations projected from a moving picture machine, to show by contrast the value of improved breeding and feeding in the beef cattle industry of the Dominion.

The exhibit of the Markets Intelligence and Stock Yards Service Division, consisted of a series of large charts, illustrating market movements and prices of commercial live stock. The exhibit was designed particularly to impress upon the producer the value of regulating the movement of stock to the market, of finishing before marketing, and meeting market requirements as to weights and seasonable outlet. The relative standing of the competitors for the bacon trade of Great Britain was shown in graph form. This exhibit was displayed at the Canadian National Exhibition and the Royal Agricultural Show.

The use of live animals in connection with the exhibitions at the larger centres for the purpose of demonstrating the differences between good and poor producing and market specimens has again been a feature of the exhibits. This was particularly evident at the Royal Winter Fair at Toronto. Motion pictures have also been a feature at many of the exhibitions during the past year and it is anticipated that with the more powerful machine now in use it will be possible to extend this line of activity to other shows.

In addition to the exhibits much valuable publicity has been obtained for the Branch through press notices dealing with particular and special phases of the work. These constitute a very strong link between the Department and producers.

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MOTION PICTURES

Motion pictures have been used by the Live Stock Branch during the past two years. Projection machines have been distributed to officers of the Branch in charge of certain districts or provinces. The distribution of projectors and films is done entirely from Ottawa; the arranging of meetings at which the pictures are to be shown is left in the hands of the district officers.

The Acme—a standard machine—is used and all pictures are printed on non-inflammable stock.

Some strictly technical films have been made. Scenarios are prepared by officers of the Branch, who also superintend the locating of suitable settings for the pictures, the necessary properties, etc.

The pictures are taken, developed, printed and given their first test by the Publicity Bureau, Department of Trade and Commerce. This bureau is fully equipped for the work, and the different departments of the government are charged the bare cost of production.

Although there is a certain disadvantage in the treating of highly technical subjects, this will be practically eliminated by the use of a projection machine with a special shutter which allows for the stopping of the picture at any particular scene. There may be points upon which it is necessary to elaborate, and with this new device the motion picture may be stopped, and subject explained and discussed. The particular point explained, the motion picture is continued.

The programme of the meetings at which these pictures are shown is usually arranged to provide some variety. A short address on the subject of the technical films, and one or two scenic films. The latter are also secured from the Department of Trade and Commerce, being part of the "Seeing Canada" series that is now receiving world-wide distribution.

The motion picture as a means of actually depicting agriculture in all its varied phases is increasing in popularity. Officers of the Live Stock Branch report good results from the use of the pictures and the pictures are in increasing demand.

THE SEED BRANCH

The Seed Branch maintains laboratories or analytical services for the testing of seeds, feeding stuffs and fertilizers; encourages the production and marketing of superior seeds for domestic requirements and export; provides an inspection service for the administration of the Seed Control, Feeding Stuffs and Fertilizers Acts; and maintains the Seed Purchasing Commission.

SEED TESTING AND FEED ANALYSIS

During the year April 1, 1922, to March 31, 1923, 33,115 samples of seed and feed were examined for purity, germination, or percentage composition. The following table shows the number of samples and their source tested by each laboratory:—

	Ottawa	Toronto	Winnipeg	Calgary
Trade...	8,999	3,795	2,129	3,069
Customs.....	1,295	1,350	2,021	2,013
Official.....	894	46	269	1,06
Feeding stuffs.....	103		468	85
Investigation..	4,912		1,103	368
	16,203	5,191	5,990	5,731

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Trade refers to samples of seed sent in by merchants, farmers and institutions.

Customs refers to samples of seed taken from imported shipments by the customs officials.

Official includes both seed and feed samples taken by inspectors from lots which are sold or offered for sale and suspected of violating the Seed Control or the Feeding Stuffs Acts. Prosecutions are based on the results of analyses of such official samples.

Feeding Stuffs in this list includes all feeds, and in addition condiments and tonics sent in by farmers, merchants and others who desire to know the approximate composition and value.

Investigation comprises all work of an experimental nature which is outlined below.

MICROANALYSIS OF FEEDING STUFFS

The work in microanalysis of feeding stuffs is expanding rapidly. During the past year over two hundred samples of mill feeds, cereal products, screenings, concentrates, condiments, medicated feeds and tonics have been examined microscopically, and many violations of the Feeding Stuffs Act have been discovered. Largely on the evidence of microscopy several court cases have been successfully completed, and numerous infringements, not proceeding to legal action, have been discouraged.

A review of the analyses shows many cases of misrepresentation and the clever use of adulterants. Various and ingenious have been the products sold as one or other of the mill feeds, care being taken in all cases to make them comply with the required chemical standards. Feeds sold as shorts have been found to consist of ground bran and feed flour; middlings to consist of feed flour and ground shorts. Ground corn, oat hulls, oat shorts, germ meal, rye middlings, screenings and ground wheat of poor quality and containing smutted or ergotized grains have been used as adulterants in all classes of mill feeds. In many cases cereal by-products have been added to cereals and the whole ground and sold as pure chop. Many of the medicated feeds have been found considerably misrepresented in their statements of contents, the same feed varying widely in its ingredients and in the proportion of each from time to time.

A number of unofficial samples, received with accompanying complaints from farmers, merchants and others, have been medicated feeds or tonics. In these, moss or club moss with accompanying debris has been used as a filler, and often as the chief ingredient. The most commonly used adulterants in all classes of feed have been ground screenings and oat hulls. Gradually, however, the sale of feeds is being brought under control, and an increasing number of manufacturers are acknowledging the presence of screenings and registering the feeds in compliance with the Feeding Stuffs Act. The fraudulent use of oat hulls has been checked, due in part to the educational circular on oat hulls.

Microanalysis of feeding stuffs is a new process, and throughout the year all the investigational work possible for the establishing of new and better methods in the identification of ingredients and the determination of percentages of each has been carried on, and much progress has been made.

INVESTIGATION AND RESEARCH

Between trade seasons a considerable amount of special work is carried on, some of which is not listed in the table above. The following problems have been investigated to some extent during the past year:—

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1. Testing of standard samples supplied by the European Association of Seed Analysts and the Association of Official Seed Analysts of North America, with a view to standardizing, in so far as practicable, laboratory methods of seed testing.

2. Continuation of longevity tests of field and garden seeds, including the comparative longevity of Canadian and foreign grown seeds.

3. A study of Canadian grown red clover seed. This work is being conducted in collaboration with European and American workers, and involves a study of the characteristic weed seeds of the red clover producing areas of Europe and North America.

4. Effect of heat on the vitality of corn. This was carried on as a part of the corn borer investigation of the Entomological Branch.

5. Investigating different methods to secure maximum efficiency in germinating certain seeds.

6. Correlation of laboratory and field germination tests. This is to ascertain the value of laboratory results as compared with actual field growth.

7. Study of hard-seededness in alfalfa and clover seeds. A considerable number of these seeds remain hard and dormant and will not germinate along with others, but may grow later.

8. Effect of different storage conditions on Canadian grown seed of low vitality. The question has arisen as to whether seeds will keep better in cold storage.

9. Effect of storage on sunflower seed.

10. Microanalysis studies in the qualitative and quantitative determination of ground feeding stuffs, stock tonics and fertilizers.

EDUCATIONAL WORK

A circular "Oat Hulls and their Use in Feeding Stuff" was published and distributed to the public.

The two book publications "Farm Weeds of Canada" and "Fodder and Pasture Plants" have been reprinted and are on sale at the office of the Superintendent of Stationery.

THE SEED DIVISION

The Seed Division devotes attention to that part of production pertaining to interprovincial and interdistrict commerce in seed supplies and to the Canadian production and international trade in seeds of all kinds.

Laws and regulations applying to the export and import of seeds by certain countries have a very important bearing on Canadian seed supply. The trend of the trade in many kinds of seeds would seem to indicate that unless our seed control regulations are equivalent to those of other countries we are apt to have on our markets too much of the seed of a quality that cannot be marketed to advantage in those countries, because of their higher standards and more efficient control.

This matter was carefully studied and a new Seeds Act has been drafted to replace our present Seed Control Act, which will bring all phases of seed control on a level deemed necessary in the best interests of Canadian agriculture. Preparing provisions for this seed law and regulations thereunder constitutes an important part of the work of the Chief of the Seed Division. In carrying these regulations into effect a general supervision over each inspection district co-ordinates the work of each district inspector and establishes uniformity particularly in respect to the grading of seed for commerce.

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Seeds imported into Canada are subjected to inspection and tests under the provisions of the Seed Importation Regulations. The following table shows the Canadian imports and exports of seed by main classes during the fiscal year ending March 31, 1922:—

Class of Seed	Imports in 1922	Exports in 1922	Favourable or adverse balance
	lbs.	lbs.	lbs.
Alfalfa.....	844,986	46,020	— 798,966
Red clover.....	2,153,860	457,860	— 1,696,000
Alsike.....	87,547	8,944,500	8,856,953
Other clover.....	191,571	6,011,280	5,819,709
Grasses, including timothy.....	11,060,710	4,144,272	— 6,916,438
Flax.....		863,408	863,408
Sunflower.....	196,914		— 196,914
Other forage crops and seed grain....	1,186,183	1,450,000	263,817
Vegetable.....	1,663,689		— 1,663,689
Field root.....	410,123		— 410,123

Importations of red clover seeds of southern origin, during the past season, gave cause for some anxiety on account of reports received of such seed not being winter hardy when grown in northern climates. Samples of red clover seed were collected direct from southern France and Italy, and tests were started in co-operation with the Experimental Farms Branch to test out the hardiness of these southern grown red clover seeds when grown in different localities in Canada. If these tests prove the reports to be true that seed from these sources is not winter hardy, then necessary legislation will be provided to safeguard Canadian users of seed.

For this spring's sowing a few pounds of Montgomery red clover seed have been obtained from Professor Stapledon, Director of the Plant Breeding Station, Aberystwyth, Wales. This is a variety proven most adaptable to English conditions, and has been brought here to try out with a view to developing two or three seed centres in the clover growing districts. It is the intention to export this variety of red clover seed under Seed Branch inspection to meet the demands of the English market. Progress has been made in the multiplication of special strains of orchard grass and white clover imported from Europe last year with the ultimate object of producing these seeds in car lot quantities for export.

Active measures were taken last fall to provide grade standards for Canadian grown alsike and red clover for export, and effort is being made to give the best assistance possible to the Canadian seed grower and seed trade in the development of this market. In addition to clovers and grass seeds considerable quantities of northern grown superior quality seed grain have been exported, and the demand for these seeds is increasing from year to year.

INVESTIGATION

In connection with the control of the trade in field root and garden vegetable seeds, samples are taken from the retail dealers of the different kinds and varieties distributed by wholesale seedsmen and are tested at Ottawa for vitality and genuineness of variety. The latter is determined by field tests conducted in co-operation with the Forage Plant and Horticultural Divisions of the Experimental Farms Branch. Last year 116 plots of field root and 386 plots of garden seeds were tested, and reports were made to each wholesale seedsman whose seeds were under test, indicating the vitality and percentage of plants true to variety name and accompanied by photographs showing the quality of typical roots harvested from each field root plot. These reports have resulted in increased in-

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terest by the seed trade in the quality of seed stocks distributed by them. This work for 1923 is being extended to test more kinds and varieties, and in addition to vitality and purity of variety tests a report will be made of the genuineness of variety names and truth as to description of varieties under sections 6 and 7 of the new Seeds Act.

CO-OPERATION WITH THE PROVINCES

For encouraging the production of high grade, hardy, northern grown seed for commerce, subventions are paid to Provincial Departments of Agriculture towards conducting seed crop competitions, combined seed crop and cleaned seed competitions, seed fairs, and provincial seed exhibitions. The maximum amounts made available for these competitions from the Seed Branch appropriation are as follows:—

Standing Seed Crop Competition.....	\$	50 00
Combined Seed Crop and Cleaned Seed Competition.....		200 00
Local Seed Fair.....		75 00
Provincial Seed Exhibition.....		600 00

Any one agricultural society is eligible to conduct two competitions, including either a seed crop competition and seed fair, or a combined seed crop and cleaned seed competition and seed fair. The subvention grants are payable to the Provincial Departments of Agriculture on the basis of two-thirds of the premiums paid by the provinces in prize money but do not exceed the maximum amounts above named. The provinces pay the cost of organization and judging, so that the expenditures by the Provincial and Dominion Departments of Agriculture are about equal.

The subventions paid by the Seed Branch on account of these competitions held during the fiscal year ending March 31, 1923, were as follows:—

STANDING SEED CROP COMPETITIONS

	Number	Amount
Prince Edward Island....	7	\$ 321 14
Nova Scotia.....	8	310 40
New Brunswick.....	26	1,285 33
Quebec.....	119	5,633 25
Ontario.....	244	12,200 00
Manitoba.....	45	1,503 22
Saskatchewan.....	114	3,998 06
Alberta.....	2	100 00
	<hr/> 765	<hr/> \$ 25,411 40

COMBINED SEED CROP AND CLEANED SEED COMPETITIONS

Prince Edward Island ..	5	\$ 591 49
Nova Scotia ..		
New Brunswick.....	4	293 34
Quebec.....	14	2,416 67
Ontario ..	35	7,000 00
Manitoba.....	1	158 00
Saskatchewan ..		
Alberta ..		
	<hr/> 59	<hr/> \$ 10,559 50

LOCAL SEED FAIRS

Prince Edward Island.....	3	\$ 132 83
Nova Scotia.....	4	239 50
New Brunswick.....	5	325 50
Quebec.....	73	3,550 26
Ontario.....		
Manitoba.....	26	1,012 58
Saskatchewan.....	23	969 34
Alberta.....	7	516 00
	<hr/> 144	<hr/> \$ 6,737 61

PROVINCIAL SEED EXHIBITIONS

Prince Edward Island.....	1	600 00
Nova Scotia.....	1	202 50
New Brunswick.....	1	600 00
Quebec.....	2	1,200 00
Ontario.....	1	600 00
Manitoba.....	1	495 34
Saskatchewan.....	1	600 00
Alberta.....		
	\$	\$ 4,297 84

In the case of British Columbia an annual grant of \$2,500 is paid by the Department of Agriculture towards encouraging the production and marketing of field root and garden seeds. The Provincial Department of Agriculture authorizes the expenditure of an equal amount for this purpose.

ASSISTANCE TO CANADIAN SEED GROWERS' ASSOCIATION

The Canadian Seed Growers' Association is a national organization of farmers who specialize in the production of Registered and Extra No. 1 seed. They multiply for commerce the foundation stock seeds called "Elite Stock Seed" produced by Dominion and Provincial Experiment Stations and sometimes by provincial growers.

The association office functions as a registration bureau for seeds; maintains systematic records of their history and pedigree; directs the work of the growers; provides inspection of the threshed grain at a small cost; publishes a seed catalogue, and serves as a clearing office for marketing. Registered and Extra No. 1 seed provides much of the seed stocks for field crop competitions, local seed fairs and provincial seed exhibitions.

Complete information as to the work of the association may be obtained from their Annual Report published in 1922. Financial support from the Seed Branch was continued during the past year to the extent of \$10,000.

THE FEED DIVISION

Under the provisions of the Feeding Stuffs Act all commercial feeding stuffs to be offered for sale in Canada must first be registered with the Department, such registrations to expire on the last day of September following the date of issue. The following table shows, by provinces and foreign, the number of manufacturers securing registrations, and the number of feed products registered during the past registration year.

Province	Number of Manufac- turers	Number of Registered Brands
Alberta.....	9	23
British Columbia.....	27	105
Manitoba.....	12	22
New Brunswick.....		
Nova Scotia.....	2	11
Ontario.....	137	417
Prince Edward Island.....		
Quebec.....	17	64
Saskatchewan.....	3	4
Foreign.....	21	40
Totals.....	228	686

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By careful and systematic inspection of feed manufacturing plants and materials employed therein, and by analyzing botanically, microanalytically and chemically feed samples secured by inspectors in the wholesale and retail trades, much has been done during the past year to expose and stamp out fraudulent and misleading practices in the feed trade. The illegal adulteration of wheat mill feeds with oat hulls, the substitution of oat hulls for oats in chop feeds, the incorrect and misleading labelling of feed products, and other irregular practices of a similar nature quite common in former years, and particularly during periods of feed scarcity, are now rarely attempted, and retailers more and more are demanding of manufacturers to be supplied only with feed products that in all respects comply with the provisions of the law.

Tactful but firm methods in dealing with violators of the Act have usually secured prompt and satisfactory adjustments without recourse to the courts, but deliberate and persistent violators have been prosecuted with salutary effect.

By-products resulting from the manufacture of flour from wheat have received careful study. Following a special survey of the practices employed in all sections of the flour milling trade, and a check as to the chemical composition of the various by-products produced at the different mills, conferences were arranged between representatives of the live stock and milling industries and departmental officials, and the following classification and standards of quality were agreed upon and made effective by regulation:—

	Minimum Protein	Minimum Fat	Maximum Fibre
	%	%	%
Bran.....	15.00	3.50	11.50
Shorts.....	16.00	5.00	8.00
Middlings.....	16.50	3.50	4.50
Feed flour or low grade flour .....	.....	.....	2.00

The enforcement of these standards has eliminated much of the feeders' cause for complaint regarding the inferior quality of mill feeds placed on the market during recent years.

The practice of manufacturing wheat mill feeds, and particularly shorts, into commercial feeding stuffs by adding thereto the screenings removed from the wheat prior to milling, is quite general amongst the larger milling concerns, and has, with some justification, given rise to many complaints on the part of feeders. This practice unfortunately lends itself to certain abuses, which, if persisted in by manufacturers, will necessitate legislative amendments to regulate more rigidly the sale of wheat by-products.

Particular attention and study have been devoted to elevator screenings with a view to devising methods for placing the sale of this material on a more satisfactory and equitable basis, thus preserving for Canadian feeders a very large quantity of valuable feed which has hitherto largely found its way out of the country. Upwards of a hundred and fifty thousand tons of screenings are removed annually from grain at the terminal elevators at the head of the great lakes. Because of the content of chaff and dust and of mustards and other objectionable fine weed seeds, these screenings in their original state find practically no market in Canada, and in past years the bulk of them has been exported to the United States. When properly recleaned they constitute a valuable and economical feed for mature stock. Accordingly some two years ago a conventional grade was established for "Standard Recleaned Screenings," since which time this class of screenings, which may contain a maximum of three per cent of chaff and dust and three per cent of fine weed seeds, and shipments of which

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may be covered by a grain inspector's certificate, has rapidly increased in popularity and demand. During the past year many thousand tons of Standard Recleaned Screenings have been purchased by Canadian feeders, and the benefits accruing from the establishment of this grade are recognized alike by feeders and owners of elevator screenings.

Much valuable and reliable data regarding the exact composition of all classes of elevator screenings have been collected, which it is confidently believed will provide a suitable basis for the further standardization of screenings in the interests of all concerned.

Standardization as to name and quality of the numerous feed materials found on the market is an important feature of feed regulatory work. The development of new industries and the constant changes and improvements in the manufacturing processes of established industries from which by-product feed materials result, necessitate from time to time additions to and revisions in those standards already fixed. As an educational feature representative collections of feed materials have been put up in suitable cases for distribution to agricultural colleges and schools, and are also available at a nominal charge to agricultural representatives and others engaged in agricultural extension work.

MARKETS AND FERTILIZER DIVISION

This Division compiles and issues seed crop and market reports, renders assistance in seed marketing, supervises registrations of fertilizers, and assists in the administration of the Fertilizers Act, 1922.

SEED CROP AND MARKET REPORTS

These reports were issued from time to time during the production and market seasons, the object being to provide farmers and dealers with authoritative information that would guide them when buying and selling seed. Only those who demonstrated an interest in the reports, by supplying local information, were placed on the mailing list to receive them. The number of people interested in the reports is increasing as the value of the reports is becoming known.

SEED MARKETS EXTENSION

Suggestions were offered and directions given to growers who desired to improve their organization for seed marketing. Blue-print plans, specifications and bills of material for a small capacity seed elevator that would be suitable for operation by a farmers' club were prepared and made available to the public at two dollars per set. The demand for these blue-prints has been satisfactorily large.

FERTILIZER CONTROL

The fertilizer control work, conducted in accordance with the Act regulating the sale of agricultural fertilizers, consists in the registration of the various brands to be offered for sale, the examination of fertilizers at the place of manufacture, distribution and sale, the inspection of methods of labelling and selling, the procuring of official samples for analysis to check the manufacturers' or importers' guarantees of plant food substances and fineness, and the prosecution of those parties considered guilty of violation of the law.

All registrations under the Fertilizers Act, 1922, expire on July first following the date of issue, but may be renewed from year to year. From July 1, 1922, at which time the Act came into effect, to May 4, 1923, registrations were assigned to sixty-one manufacturers and importers covering 305 different brands of fer-

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tilizers. By provinces, and foreign, the number of firms who applied for registrations and the number of registrations assigned were as follows:—

Province	Firms	Registrations
Nova Scotia.....	9	48
Prince Edward Island.....	1	5
New Brunswick.....	8	26
Quebec.....	16	114
Ontario.....	1	1
Manitoba.....	2	4
Alberta.....	11	25
British Columbia.....	13	82
Foreign and United States.....	61	305

The total fees collected for registrations amounted to \$6,091.00. The principal kinds of fertilizer for which application for registration was made include:—

1. Chemical fertilizer of different but complete formulæ.
2. Fertilizer carrying organic nitrogen and phosphoric acid of different but complete formulæ.
3. Bone products.
4. Tankage.

On the whole the trade has generally observed the provisions of the Act and willingly made the necessary adjustments where the need of such has been directed to their attention. The provisions of the present law are different in many respects from those previously in effect under the Act of 1909 and amendments of 1919, and the trade has been more or less confused while making adjustments in the methods of manufacture and sale of the fertilizer to conform with the new provisions during this their first year of enforcement. Only in isolated instances where manufacturers have deliberately aimed to defeat the purpose of the law has it been found necessary to recommend prosecution.

Analytical services in respect of chemistry under the Fertilizers Act have been obtained from the laboratories under the Department of Health and those of Canadian universities and colleges. At present there are twenty-two official analysts authorized under the Fertilizers Act, 1922, to receive official samples from inspectors and the public and issue certificates of analysis thereon. During the year 387 official samples, representing as many brands of fertilizer, were analyzed and reported.

Since the Fertilizers Act, 1922, came into effect marked improvement has been observed in the trade in the reduction of the number of brands of fertilizer of low analysis, misleading brand names, and the multiplicity of brands, which factors heretofore tended to confuse the purchaser.

MARITIME DISTRICT

The district office of the Seed Branch in the Maritime Provinces is located at Truro, N. S., and the work is directed by a district inspector. Four seasonal inspectors are employed during the busy season of the seed, feed and fertilizer trade.

SEED PRODUCTION AND SUPPLY

The 1922 season was particularly favourable to crop production in this district. The No. 1 seed oats supplied through the Seed Purchasing Commission gave excellent results, and farmers will not be satisfied to purchase ordinary

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commercial oats as seed in future years. The requirements for the 1923 seeding of cereal grains are being met within the district, and Prince Edward Island supplied thirty thousand bushels of Extra No. 1 and No. 1 seed oats to Quebec.

The combined seed crop and cleaned seed competitions, which are conducted by the Provincial Department of Agriculture in co-operation with, and financially supported by, the Seed Branch, are proving very effective in encouraging the organization of seed centres, particularly for oats and potatoes. Local seed fairs and provincial seed exhibitions brought out a large display of the very best seed this year, and served as valuable advertising and marketing agencies to the growers. Our inspectors act as judges at these competitions and fairs, and the district inspector assists in training the provincial judges for standing crops.

INSPECTION

In addition to towns scattered along 3,666 miles of railway there are many seaport towns which have to be visited by our inspectors. During the past year 917 visits were made to points requiring inspection; 1,024 inspections were made of seed warehouses, 1,597 of feed, and 57 of fertilizer warehouses. There were 14 suspected violations of the Seed Control Act and 25 of the Feeding Stuffs Act. Court action will be taken on the more serious offences. The six cases under the Seed Control Act, recommended for prosecution on the 1921-22 season, were all successfully conducted. Maritime farmers prefer to buy pure feeds rather than the mixtures sold as commercial feeding stuffs. The bran and shorts on the market were up to standard, but middlings gave considerable difficulty. Fertilizers were generally well up to the guaranteed analysis.

EDUCATIONAL WORK

Several meetings were addressed to explain the new Fertilizers Act. Judging classes were conducted at seed fairs, and assistance was given in provincial short courses in agriculture. The district inspector acted as a judge of potatoes at the Royal Agricultural Fair, Toronto.

QUEBEC

The organization in Quebec included a district inspector with headquarters and staff in Quebec City, and six permanent and seasonal inspectors, stationed at suitable places in the province. Since the enforcement of the Feeding Stuffs Act was taken over by the Seed Branch it was found necessary to appoint an inspector for the Montreal District, with headquarters in that city. This was done largely on the request of the seed merchants and millers in Montreal.

SEED PRODUCTION AND SUPPLY

Field crop competitions were held in every county in Quebec this year, and were followed by seed fairs in every county also. The different kinds of crops entered in the field crop competitions and seed fairs included oats, wheat, barley, grass seed, potatoes, etc. More farmers took part in these competitions last summer than previously, showing their increasing interest in this work. Two special competitions were organized with Alaska oats. This early variety is becoming more popular every year in districts where the growing season is short. The combined competitions were held in eighteen counties, the number of competitors being 1,297. The quantity of cleaned seed inspected was 27,800 bushels. Of this, 33 per cent graded No. 1, 50 per cent No. 2, and the balance graded No. 3. The germination of oats averaged 95 per cent, and the weight per measured bushel 36.5 pounds, the variety being mostly Banner. This

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work contributed also in encouraging the farmers to grow clover seed. Over 200 farmers took part in the competitions with clover, but due to the lack of facilities for cleaning, over 30 per cent of the samples were rejected. Nearly every farmer who took part in these competitions produced his own seed for sowing this spring, and 50 per cent had some for sale. In one county four carloads of No. 1 seed oats were sold and they had four hundred bushels of Registered seed of high quality. Due to this work and a fairly good crop in Quebec last year, very little seed was imported.

REGISTERED SEED

The majority of the farmers who took part in the combined competitions are also members of the Canadian Seed Growers' Association. A large number applied for their grain to be registered, but a considerable quantity was not accepted on account of the impurities in the seed. The impurity which causes most trouble with oats at the present time is barley. Some 2,956 bushels, however, were registered, and over 50 per cent of the balance graded Extra No. 1 and No. 1. Of the quantity registered, over 2,000 bushels were cleaned and inspected at the Ste. Rosalie elevator. This is operated by a co-operative society which buys the grain on the condition that if it is not found suitable for registration after cleaning, the grower will be paid the market price for whatever grade it receives. The system has proven to be very satisfactory.

INSPECTION

In the course of the year 1,474 seed merchants, 2,787 feed merchants, and 175 fertilizer dealers and manufacturers were visited. Although a large number of seed merchants were visited, the time of the inspectors was spent mostly with those selling feeds and fertilizers. The latter have been accustomed to selling fertilizer at high prices, without any regard to its value from the farmer's standpoint. It will require very rigid inspection and considerable educational work with both the farmers and the dealers before satisfactory results are obtained. Quebec is still being made the dumping ground for certain inferior feeding stuffs, but fewer violations this year indicate that this practice has been considerably reduced.

FERTILIZER EXPERIMENTS

In order to help the farmers to find out the practical value of fertilizers, two experiments were started in co-operation with the Provincial Government. One of these experiments is being conducted with thirty farmers in Bromptonville, Richmond county, and the other with the Dairy School at St-Hyacinthe. A part of their farm is being used for that work. The former would be better classified as a demonstration, aiming to show the farmers the kind, value and the best way to apply fertilizers with a proper crop rotation. Dr. F. T. Shutt, Dominion Chemist, supplied the formulæ most suitable for the different kinds of crops with which the demonstrations will be carried on. The latter is an experiment with three different kinds of basic slag, namely, English, Belgian and Canadian. This experiment may be considered as an endeavour to solve the problem of the relative values of the different kinds of basic slag sold in the province. It is proposed to conduct it for five years under a carefully planned rotation system. The basic slag used for this experiment was obtained free of charge from firms interested in this special work.

EDUCATIONAL WORK

All the inspectors were engaged at various times during the year in educational work. This was in the form of lectures at seed fairs, exhibitions, agricultural meetings, and of personal visits to the farmers in their respective districts. In Quebec, a large number of farmers still buy cheap seed and cheap feeding stuffs, which in the end are more expensive than many high priced products. On every occasion the attention of the farmers was drawn to that fact, and the inspectors find a constantly increasing demand for the better quality products. Articles were prepared by the inspection staff and published in the press of the province.

EASTERN ONTARIO

This district comprises eastern and northern Ontario to lake Nipigon, also Wright and Pontiac counties in Quebec. The field work during the past year has been done by a district inspector, with headquarters at Ottawa, and three permanent and seasonal inspectors conveniently located in the district.

SEED PRODUCTION AND SUPPLY

The season of 1922 gave very variable crops in eastern Ontario. Clover meadows and fall wheat were seriously injured in some localities from bad winter conditions—hard freezing, lack of snow, and covering of ice. Feed oats used for seed gave poor germination in many cases, but the high weed seed content proved quite vital. The corn crop was retarded by the cold wet weather of early summer, but later made rapid improvement to a normal crop. Late sown oats suffered badly on the flat undrained lands, and rust struck severely in the St. Lawrence, Rideau, Nation and lower Ottawa valleys. However, the general condition of the cereal grain and other crops throughout the district was good, and particularly so in Central Ontario, which had large surpluses of fall wheat, oats, field and garden peas, red clover, alsike, sweet clover and alfalfa. The Bobcaygeon and each of several other districts had forty to fifty thousand dollars worth of red clover seed and a considerable offering of local alfalfa. Sweet clover is supplanting alfalfa for grazing in eastern Ontario. It is hardy, gives a luxuriant growth, and provides excellent pasture. A very large meadow acreage was seeded to make up for the failure of the new meadows in 1921, and promises well for 1923. Several lots of European orchard grass, wild white and Danish white clover seeds were placed in suitable localities with a view to the development of seed production centres for home requirements and export.

INSPECTION

Points requiring inspection received 1,850 visits; 1,534 warehouse inspections were made for seed, 1,957 for feed, and 5 for fertilizers. There were 147 suspected violations under the Seed Control Act, 28 under the Feeding Stuffs Act, and 2 under the Fertilizers Act. The more serious offences will be recommended for prosecution. Nine cases under the Seed Control Act were carried through successfully for the 1921-22 season, several of them being against farmers for selling seed contrary to grade. Feeding stuffs are generally of good quality according to the analyses. Shorts are in more demand than bran on account of pig feeding. Many farmers get their own grain chopped for feed. Bin inspections of seed oats competitions showed some very light weight grain, poor germination, noxious weed seeds, and high dockage from poor cleaning. Practically all the seed corn was offered as shelled corn in keeping with the corn-borer quarantine regulations. A few lots sold on the ear came from districts not under quarantine.

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EDUCATIONAL WORK

Besides judging of the field crop competitions, assistance was given in judging grain and field roots at fall fairs and provincial exhibitions. The district inspector took charge of an educational exhibit at the Guelph and Ottawa Winter Fairs, and distributed copies of the various Acts and related literature. He led in the discussion on weeds at the annual meeting of the Ontario Experimental Union, and assisted in short courses on weeds and seeds at several points in the district.

WESTERN ONTARIO

The Seed Branch maintains a district office and laboratory in the General Post Office building, Toronto. Inspection is carried on by a district inspector and six permanent and seasonal inspectors, supported by an office staff charged with the receiving, recording, grading and reporting of seed and feed samples.

SEED PRODUCTION AND SUPPLY

The season was very favourable to seed production, which is a very important industry in western Ontario. Alsike clover seed was a particularly good crop, but red clover was inferior to the 1921 crop in quantity, quality and colour. There was a large increase in the production of alfalfa seed, and special attention was given to multiplication of hardy strains. Some fields in Peel county have been growing alfalfa continuously for twenty years, and action has been taken toward registration of the seed crop. There was a strong demand for local grown seed, and a larger acreage of alfalfa will be seeded in 1923. Large quantities of Registered seed oats were required by agricultural societies taking part in seed crop competitions, but the supply was rather limited. The production of fibre flax seed for export has fallen off in Western Ontario.

INSPECTION

There were eighteen prosecutions under the Seed Control Act and six under the Feeding Stuffs Act on the 1921-22 trade season. Manufacturers and dealers in feeding stuffs generally desire to obey the law, but some require a severe warning or prosecution. Most of the brands of fertilizer which is largely manufactured in this district showed a satisfactory analysis or were very close to the line. Farmers prefer pure bran and shorts without mill run of screenings. During the year reported, 815 visits were made to points requiring inspection; 1,511 warehouse inspections were made for seed, 1,826 for feed, and 73 for fertilizers. There were 72 suspected violations of the Seed Control Act, 69 of the Feeding Stuffs Act, and 39 of the Fertilizers Act. Satisfactory explanations were given in most cases, but action will be taken on apparently wilful offences of a serious nature. The quantity of seed inspected and imported through customs totalled 11,370,224 pounds.

EDUCATIONAL WORK

The district inspector was president of the Guelph Provincial Winter Fair, and acted as judge at several of the larger fairs and exhibitions. Seed exhibits at the Royal Winter Fair were tested for purity at the Toronto laboratory to serve as a basis for judging. He attended the annual meeting of the Ontario Seed Growers' Association, and received numerous office visits from seed dealers, feed and fertilizer manufacturers and dealers, and from farmers.

MANITOBA AND SASKATCHEWAN

This district extends eastward into Ontario as far as lake Nipigon. The district office and laboratory are located at 173 Portage Avenue East, Winnipeg. Seed inspectors are maintained as required at the Saskatoon and Moose Jaw interior terminal elevators, and six permanent and seasonal inspectors control the trade in seed, feed and fertilizers.

SEED PRODUCTION AND SUPPLY

Continued heavy rains and local floods set back the spring work in many districts and created an unusual demand for seed flax, barley and spring rye. On the whole the season was very favourable and the production of seed was plentiful except in some localities west of Saskatoon. Wild oats are contaminating the once noted seed oat district in north-eastern Saskatchewan, but large quantities of No. 1 seed were available from the new lands round Verigin and Kylemore. There was a considerable increase in the quantities of Registered and Extra No. 1 seed grain available, seed centres are being organized, and farmers are giving special attention to organization for marketing. Premiums of 6 cents to 10 cents per bushel over Fort William prices are obtained for oats that will grade seed. Growers in the Manitoba combined seed crop and cleaned seed competitions had from five hundred bushels to two carloads of Extra No. 1 seed oats offering at each farm, and obtained ready markets. Seed wheat was not in such good demand. Durum wheat is finding favour at Gladstone and Arden. Alfalfa is giving good results at Neepawa, where one grower had 90 tons of hay from 30 acres and a seed plot yielding 315 pounds per acre. Local grown brome and millet were offered in southern and central Saskatchewan, and fall and spring rye are becoming quite popular in those districts. Sweet clover is giving excellent results in northern Saskatchewan, and there is an increased acreage of sunflower for silage. Alsike seed was a bumper crop at Oxdrift and Dryden, but red clover was below average, the quality being lowered by immaturity. Seedsmen are taking a pride in securing their supplies locally. Supplies of the various grass and forage crop seeds were located for the Manitoba provincial authorities, and several thousand pounds were distributed from the live stock train which toured the province.

INSPECTION

Seed inspection, aside from oats and flax, showed an improvement in quality over 1921. Conditions at feed manufacturing plants are generally good, but some of the dealers have to be checked very closely. Fertilizer inspection is practically nil in this district. Six prosecutions were conducted under the Seed Control Act and six under the Feeding Stuffs Act on the 1921-22 trade season. During 1922-23, 756 visits were made to points requiring inspection: 2,003 warehouse inspections were made for seed, 1,216 for feed, and 5 for fertilizers. There were 98 suspected seed violations, 83 feed, and 2 fertilizer. Prosecutions are now pending. Inspection of seed grain was light at the interior terminal elevators because of good crop conditions. Incoming inspections totalled only 17,417 bushels for wheat and oats, and outgoing 40,477 bushels for wheat, oats and barley. Imports inspected through customs totalled 1,847,292 pounds of seed.

Special attention was given to elevators handling grain screenings, and samples were taken from all domestic shipments at the head of the lakes. These were forwarded to the laboratory for final analysis and suspicious cases were immediately reported to district inspectors at points of delivery. Careful observation was made on the feeding of screenings to sheep. The elevator

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run was generally valuable, but there was some difficulty with refuse screenings. Sick animals are usually brought round by substituting with a considerable ration of hay, but the mortality was rather high in some flocks. Standard Recleaned Screenings purchased under inspection certificate were in good demand throughout the season.

EDUCATIONAL WORK

The district inspector judged at seed fairs and exhibitions, and addressed several meetings of seed growers particularly on problems of marketing. He attended meetings of the Saskatchewan Seed Board, the Western Society of Agronomists, and the Manitoba Soils Products Exhibition. There was a large increase in the number of office interviews.

ALBERTA AND BRITISH COLUMBIA

The organization in this district includes an inspection office and a seed and feed laboratory at Calgary. The trade is controlled by a district inspector, two permanent inspectors, one in each province, and three seasonal inspectors. The permanent inspector in British Columbia is also a seed production specialist.

SEED PRODUCTION AND SUPPLY

Seed growers in Alberta again brought great credit to themselves and to Canada by winning a large number of prizes at the Chicago International Hay and Grain Show in December, 1922. In wheat, Alberta secured seven prizes out of twenty-five awards, and in oats, six prizes out of the first ten, and thirteen in all. J. W. Biglands, a grower in the Lacombe district, took first prize in Region No. 1, as well as grand sweepstakes for the best sample of oats on exhibition, along with which goes the special trophy of the Chicago Board of Trade. This makes the third consecutive year Alberta growers have captured this trophy. Another grower, N. Taitinger, Claresholm, took first prize for his sample of two-rowed barley, which was considered the finest ever shown at Chicago. J. W. Lucas, of Cayley, secured first prize for rye. In alfalfa, Alberta growers took six prizes out of fifteen, the highest being second, and in peas, four out of five prizes. In all, thirty-six prizes for seed came to Alberta. It is interesting to note that most of the grains shown were grown by members of the Canadian Seed Growers' Association.

Largely due to the publicity secured, a ready market has been available for all surplus seed produced.

The district inspector took charge of the bin inspections for the Canadian Seed Growers' Association in the registering of seed in this district.

Last year some eight thousand pounds of Grimm alfalfa seed were registered, as compared with twenty-eight thousand this year. Two years ago, when the first registrations were made on this seed, two thousand four hundred pounds were registered. From this amount to twenty-eight thousand five hundred pounds in two years shows the interest taken in the production of alfalfa seed. The amount of alfalfa seed suitable for registration is only a portion of the total production, which for Alberta this past year is estimated at 135,000 and for British Columbia 30,000 pounds. There will be a further large increase in the acreage sown to alfalfa this season.

Thirteen growers were supplied with wild white clover seed imported from England by the Seed Commissioner. Reports to date indicate that it is very suitable to our irrigation districts. A quantity of timothy seed secured from the Central Experimental Farm, Ottawa, was distributed to competent growers.

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Owing to drought throughout the timothy districts, this seed crop was the lightest in years, amounting to approximately 85,000 pounds. Interest in vegetable seed production has been greatly stimulated in British Columbia, and the growers' organization is now in a prosperous financial position. Approximately ten thousand pounds of field root and vegetable seeds were produced by the growers through their organization, and some twenty-five thousand pounds were marketed, including old stock on hand from previous years.

Owing to many alarming statements being made with regard to a possible seed shortage in Alberta and parts of British Columbia, full and accurate reports were obtained covering each district and giving yields for 1922, with averages over a number of past years for comparison. Information was also secured covering financial conditions of farmers in each district. This investigation warranted us in stating that there was ample seed for all local requirements and that there was no necessity of the Seed Purchasing Commission securing any quantity of seed for distribution.

SCREENINGS

There was a shortage in the coarse grain crops which resulted in a shortage of feed throughout the district. Large quantities of elevator and mill run grain screenings were used, unground. Over fifteen million pounds of such material were shipped back into the district from Port Arthur and Fort William. Owing to these screenings containing such a heavy percentage of weed seeds, the Provincial Department of Agriculture and growers interested in keeping in check widespread distribution of weed seeds protested against allowing their use. An investigation was made with a view to ascertaining the exact quality of all screenings used and the effect of feeding them to live stock. Very useful and reliable data were secured, giving the varying percentages of injurious weed seeds in the screenings used, and their effect when fed in different quantities to cattle, sheep and hogs.

INSPECTION

During the year, inspectors in this district made 876 visits to 397 towns and cities, inspecting 1,202 seed firms, 1,125 feed, and 114 fertilizers firms, including both manufacturers and dealers. Seven prosecutions were conducted under the Seed Control Act and two under the Feeding Stuffs Act, one of which was for three violations.

Considerable difficulty has been met with in the inspection of fertilizers, but as soon as old stocks have been sold and are off the market, it is felt that purchasers will benefit to a great degree in being able to purchase a better quality of fertilizer.

Inspections indicate that seed dealers and feed dealers and manufacturers are acquiring a better understanding of the regulations of the Acts and are giving more attention to their observance.

EDUCATIONAL WORK

The district inspector again acted as chairman of the Alberta Seed Board, which has the responsibility of promoting interest in seed production, advising the best varieties for growers to produce, drafting rules and regulations which are adopted by the Provincial Government, controlling the holding of local and provincial seed fairs and standing field crop and cleaned seed competitions. This board was largely responsible for interesting the Provincial Department of Agriculture in the securing and equipping of a provincial seed cleaning plant,

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located at Edmonton. It is the intention, if this proves successful, to open another one in the southern part of the province. During the season approximately fifteen thousand bushels of Registered seed were cleaned and sold for the growers through the provincial seed cleaning plant. This Branch provided an inspector for the work.

A conference of seed growers was held in conjunction with the provincial seed exhibition, and the Alberta Seed Growers' Association was formed with a view to encouraging the production of high quality seed throughout the province. The district inspector acted as judge at this exhibition and gave an address on seed control legislation. He also judged at a number of local seed fairs held at seed growing centres, and discussed seed production suitable for such districts. He reports that the growers are manifesting greater interest, and expects that in the coming year a considerable number of new seed growing centres will be established with complete organization.

SEED PURCHASING COMMISSION

The staff nucleus of the Seed Purchasing Commission has been maintained throughout the year. Adjustments of accounts for freighting, storing and cleaning of seed grain of the previous season have entailed a great deal of work. The crop conditions of 1922 in the prairie provinces, however, were so generally satisfactory that there was deemed to be no real occasion for the commission to enter into the merchandising of seed grain for seeding during the ensuing spring.

The commission was established in 1916 on the general understanding that inasmuch as the inspection of commercial grain and seed grain and the control of public grain elevators were services provided by the Federal Government, this Government was in the best position to assemble, store, clean and distribute seed grain to meet the requirements of provincial and municipal governing bodies, which were in a position to determine who should receive credit, if any, and how much, and to assume the responsibility for the issue of credit.

It would seem that the dispensing of credit by governing bodies in general has not been attended with satisfactory results from the viewpoint of the interested public. The announcement by the Government of Alberta that the extending of credit for seed grain was to be discontinued by that province brought into question the advisability of further continuing the Seed Purchasing Commission. It was found necessary to continue the office of the commission until March 31, 1923, because of the large number of inquiries that were being received from persons who had in former years purchased supplies of seed grain from the commission.

During the period following October, 1916, the commission distributed more than ten million bushels of seed grain in the prairie provinces, and more than one million bushels in the eastern provinces. In addition, the commission filled substantial orders for seed grain for export during the period of the war. Approximately \$16,350,000 was advanced to the commission during this period for merchandising purposes, all of which was promptly refunded to the Receiver General, together with a surplus of more than \$250,000, which is sufficient to pay all operating expenses and a fair rate of interest on the money employed. The total office operating costs amounted to less than one cent per bushel of the seed grain distributed.

During this period, the commission paid over half a million dollars for the service of storage and cleaning of seed grain, which was all done in the Canadian Government interior elevators at Calgary, Moose Jaw and Saskatoon.

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It is pleasant to record that in providing this difficult service, which was clearly very much needed during the period of the war, satisfactory relations have at all times existed as between the officers of my Department and the Seed Purchasing Commission, and there is much evidence to show that the service has been highly beneficial to the interested public.

ENTOMOLOGICAL BRANCH

The officers attached to the several divisions of the Entomological Branch, as well as the officers in charge of the various field laboratories, have been actively engaged during the year in investigating the life-histories and habits of important insect pests and disseminating useful information resulting in the saving, throughout Canada, of hundreds of thousands of dollars' worth of crops, etc. The established divisions of the Branch are: Division of Field Crop and Garden Insects; Division of Forest Insects; Division of Foreign Pests Suppression, and the Division of Systematic Entomology. In addition to these divisions, special technical officers are engaged in the study of fruit insects, stored product insects, live stock insects, natural control of insects, etc.

Under the direction of the Dominion Entomologist, the Regulations under the Destructive Insect and Pest Act have been administered in so far as they refer to insect pests.

By Order in Council passed on April 21, 1922, the Destructive Insect and Pest Act Advisory Board was constituted for the purpose of administering the Regulations under the Destructive Insect and Pest Act, as well as to advise the Minister of any changes to the regulations that may be considered necessary. The officers of the Department appointed as members of the board and the office they now hold are as follows: Mr. Arthur Gibson, Dominion Entomologist and head of the Entomological Branch, Chairman; Mr. E. S. Archibald, Director, Experimental Farms Branch, Vice-Chairman; Dr. J. H. Grisdale, Deputy Minister; Mr. H. T. Gussow, Dominion Botanist, Experimental Farms Branch; and Mr. L. S. McLaine, Chief, Division of Foreign Pests Suppression, Entomological Branch, Secretary.

The following amendments to the regulations were passed during the year April 1, 1922, to March 31, 1923:—

By Ministerial Order passed on September 5, 1922, Quarantine No. 2 (Domestic), was amended by adding thirty townships in southern Ontario which were found to be infested with the European corn borer.

By Ministerial Order passed on September 27, 1922, Quarantine No. 2 (Domestic), was again amended by adding fifteen additional townships in southern Ontario, which were found to be infested with the European corn borer.

By Order in Council passed on February 26, 1923, the regulations dealing with the importation of nursery stock were amended by prohibiting the importation of plants with soil about the roots from Asia, on account of the Japanese beetle and other soil-infesting insects.

By Order in Council passed on February 26, 1923, Quarantine No. 1 (Domestic), dealing with the apple sucker outbreak in Nova Scotia was brought up to date. The ministerial orders and supplements thereto were rescinded and superseded by the Order in Council on the date stated.

By Order in Council passed on February 26, 1923, Quarantine No. 2 (Domestic), dealing with the European corn borer outbreak in southern Ontario was revised. The Order in Council passed on February 10, 1922, and the ministerial orders passed as supplements thereto were rescinded and superseded by the revised Order in Council on the date stated.

DIVISION OF FIELD CROP AND GARDEN INSECTS

Grasshoppers responsible for important injury in the Prairie Provinces and in British Columbia were given special study in 1922. It is with satisfaction that our officers report that the condition on the prairies, with regard to these destructive insects, is considerably relieved, but in British Columbia the very serious outbreak which occurred in 1922 will doubtless occur again in 1923. Investigations with grasshoppers have taken the form, mainly of studies in poisoned bait formulae and the identification of parasitic and predaceous insects, the latter study being of considerable importance in determining the status of the pest.

Intensive studies in the control of the pale western cutworm have also been undertaken and considerable success has been obtained in the field control of this insect, which is the major pest of wheat in southern portions of Alberta and Saskatchewan.

Our officers report that the western wheat stem sawfly is increasing its area of distribution. At present it covers half the wheat growing area of the province of Manitoba; its distribution in Saskatchewan is very wide and there has been a material increase in Alberta. Judging from evidence in hand it is probable that the insect has caused, and is now causing, more loss than is occasioned through grasshoppers. Studies in the control of this insect are being continued. It has been found that the cutting of the wheat stems by the larvæ of this insect is accomplished when the stems are mature and is not dependent upon the stage of maturity of the larvæ. This is a very important point which will be further studied during 1923, as it will enable farmers to avoid material loss by cutting their crop slightly on the green side.

Studies of the European corn borer in Ontario are being continued. Much useful data on the control of this insect has already been obtained. In general, it may be stated that late planting of corn coupled with clean farming operations and careful ploughing will materially lessen loss to field corn. Unfortunately we have to report the spread of this insect to forty-five townships.

Investigations on potato insects in the Maritime Provinces, on the Hessian fly in Ontario and Manitoba, and alfalfa insects in Alberta, have been conducted by officers of this Division, which will enable our entomologists to advise farmers regarding the safeguarding of their crops.

DIVISION OF FOREST INSECTS

The work of this division has included further investigations of spruce budworm and beetle injuries in the provinces of Ontario, Quebec and New Brunswick, damage by the eastern spruce bark-beetle in the Gaspé region of Quebec and in northern Saskatchewan, bark-beetle outbreaks in yellow pine, western white pine, lodgepole pine and Douglas fir in British Columbia, forest sample plot studies, various other forest insects, injuries, and outbreaks by shade tree insects.

The active spruce budworm outbreak in the Temiskaming district of Quebec and in eastern Ontario appeared to be decreasing in severity this season, but the injured balsam is dying very rapidly, more than fifty per cent of the balsam over the whole 5,000 square miles of forest included in this recent outbreak being already dead or dying. Studies in Quebec and New Brunswick, have in 1922, been concerned chiefly with determining the causes and rate of deterioration of the dying and dead timber and the degree to which it can still be salvaged. This investigation is of considerable practical importance and is to be continued and extended next season.

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Further investigations of the destructive eastern spruce bark-beetle were conducted in the Gaspé peninsula and a survey made of similar injuries to valuable spruce in northern Saskatchewan. Successful control operations, recommended by our officers, have been carried out in some areas.

The control of the bark-beetle outbreaks in yellow pine in British Columbia has been continued with marked success by the Dominion and Provincial Forest Branches under the direction of our officers. The area under control was considerably extended.

The forest sample plot studies were continued according to previous plans, several additional plots being established in New Brunswick and Quebec.

Investigations of shade tree insects and the biology of various forest insects have been conducted as heretofore, particularly at the forest insect laboratory near Aylmer, Que. An important outbreak of forest tent caterpillars defoliating poplar shade trees and shelter belts caused much annoyance in the southern part of the Prairie Provinces. Spraying methods for control have been recommended by our officers.

DIVISION OF FOREIGN PESTS SUPPRESSION

This division is concerned with the carrying out of the Regulations under the Destructive Insect and Pest Act in so far as insect pests are concerned. This work entails, first, the prevention of the introduction of further insect pests by the adequate inspection of plant products, particularly nursery stock, entering Canada from foreign countries; second, the combating and prevention of spread of newly imported and dangerous pests which when discovered are confined to a more or less restricted area; third, the maintenance of foreign and domestic quarantines; fourth, the examining of territory which may have become infested with new pests; and fifth, the inspection of plant products for export to foreign countries.

During the importation season 1921-22, a total of 2,197,625 plants classed as nursery stock entered Canada from Great Britain, United States, Holland, France, Belgium, Japan, Poland and Luxemburg. All these plants were examined by inspectors, and 128 shipments were found to be infested with foreign pests. In addition, the following shipments of nursery stock from the United States and Japan passed through the Dominion fumigation stations: 19 carloads, 412 cases, 647 bales, 356 boxes, and 780 parcels. The value of the plants, trees, shrubs, vines and florists' stock, but not including cut flowers, imported into Canada for the year ending March 31, 1922, was \$811,919.

The brown-tail moth suppression work in Nova Scotia and New Brunswick was continued during the year. Up to March 31, 1923, 491 winter webs of this pest were found in the former province as compared with 979 found the previous year. No nests were found in New Brunswick.

The scouting for the European corn borer in southern Ontario carried on during the summer of 1922 showed that this insect had not spread over as much new territory as in the previous year. One hundred and sixty-two townships are now quarantined, covering 12,616 square miles. In accordance with the quarantine placed on Ontario by the United States Department of Agriculture, nine hundred and sixty-five inspection certificates for export shipments of oat straw, cut flowers, beets, beans, rhubarb, celery, spinach, etc., were issued. Five individuals were prosecuted and fined for infringing the domestic quarantine.

The apple sucker quarantine in Nova Scotia was maintained during the year, and additional territory found infested. The total area now infested covers 3,750 square miles, an increase of thirty-three per cent over the preceding year. Four hundred and forty-three permits and certificates for 66,429 plants were issued during the year.

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A report having been received to the effect that the gipsy moth had possibly been brought into Ontario, a careful inspection was made of several nurseries in Ontario. Scouting was also carried on for this insect in the Eastern Townships of Quebec, as the gipsy moth has been found in Bloomfield, Vermont, approximately fifteen miles from the border.

Owing to the rapid increase in the amount of alfalfa grown in the Prairie Provinces and the danger of importing the alfalfa weevil, a serious pest of this crop, extensive scouting for this pest was carried on in southern Alberta during the summer of 1922. A total of 300 farms were visited and 6,680 acres of alfalfa examined. We are pleased to report that no specimens of the alfalfa weevil were found in the 317 collections of insects which were made.

DIVISION OF SYSTEMATIC ENTOMOLOGY

Systematic studies of Canadian insects, based on the material in the Canadian National Collection, have been continued by the officers of this division. Particular attention has been paid to such important groups as the Ephemeridae (May-flies), the larvae of which are aquatic and very important as fish-fodder; the Asilidae (Robber-flies), predaceous on other insects; the Syrphidae (Hover-flies), destructive to plant lice; the Tortricidae (Leaf-rollers), frequently injurious to vegetation, etc.

As a result of these studies, not only has the material in the National Collection in these various groups been placed on a satisfactory classificatory basis, but numerous species, hitherto unreported from Canada, have been added to our faunal lists and over seventy-five species of insects new to science have been described. The addition of the type specimens of these new species to the Canadian National Collection has materially enhanced its value.

It may be noted in this connection that there has been a gratifying increase in the number of communications received from scientists in various institutions, notably in the United States, requesting information regarding the above-mentioned groups, sending material for determination by our officers, or asking the loan of material for study. In fact, it may definitely be stated that the Canadian National Collection of Insects is now generally recognized as one of the major North American collections. Its value to all classes of entomologists is increasing yearly, due to the careful taxonomic studies conducted by the officers of the Division.

During the year the field activities of the branch officers have resulted in the addition of over 15,000 specimens to the National Collection. Members of the staff of the Geological Survey, Department of Mines, have also from time to time sent in various lots of insects for determination and incorporation in the National Collection.

Additional steel cabinets and insect drawers have been purchased and the transferring of a further portion of the National Collection to these fire-proof receptacles has been accomplished.

Numerous determinations of insects, injurious and otherwise, have been made for institutions such as provincial museums, agricultural colleges, schools, etc. Individual collectors and entomologists have also availed themselves of the services of the divisional staff in the identification of insect material.

LIBRARY

The library of the Entomological Branch has been gradually built up through the purchase of numerous works on taxonomic entomology. Many of these are extremely rare and out of print and it has only been possible to secure these through dealers in second hand books as occasion offered. A good

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collection of entomological works is the first essential to conducting satisfactory systematic work and as it now stands the Branch Library is in this respect second to none in Canada.

INSECTICIDE INVESTIGATIONS

During the year 1922, excellent progress has been made in the development of cheap and more efficient insecticides. Improvements have been made in certain dust mixtures for dusting orchard trees as well as important developments in the fumigation of certain types of insects by means of nicotine vapour projected from dusting machines. During the year, the fourth successive large crop of apples was grown in the Annapolis Valley of Nova Scotia. This crop was of exceptional quality, being very clean and of high colour. This condition of affairs is due in no small way to the investigational and other work conducted by our insecticide entomologists.

NATURAL CONTROL INVESTIGATIONS

In the province of Nova Scotia, the artificial spread of the parasitic fungous disease of the apple sucker, known as *Entomophora sphærosperma*, was very successful in 1922, and it is expected that this will result in a greatly increased crop in 1923, and a correspondingly larger revenue from each orchard in the district in which these investigations were conducted. Important progress has also been made in Nova Scotia in connection with the natural control of the green apple bug by a new species of a fungous parasite. This species has also been artificially introduced into orchards. The predaceous mite which was introduced into British Columbia a few years ago to control the oyster shell scale has spread during the year and become established in important fruit centres. Progress has also been made in studies of the larch case bearer, particularly with regard to its parasites and other natural control factors. Studies in connection with the spruce budworm, forest tent caterpillar and the larch sawfly have also been continued.

FRUIT INSECT INVESTIGATIONS

Officers of the Entomological Branch in certain of the field laboratories have been specially engaged in studying the life-history and control of important fruit insect pests. In the province of British Columbia efforts have been made to secure further information on the life-history and habits of the codling moth in the Okanagan district. The officer in charge of the Victoria, B.C., laboratory has developed certain improvements in the oil barriers which have been demonstrated for controlling the strawberry root weevil. The value of these barriers is being more and more appreciated by commercial growers. In the Niagara district of Ontario, a remarkable outbreak of the grape leaf hopper occurred in 1922. By means of meetings, timely articles and circular letters practically every grape grower in the district was informed as to the methods of combating this pest. As a result the growers in general were able to harvest a satisfactory crop. In the same province, a special officer was detailed to study the life-history and injury caused by the rose chafer with a view to establishing improved methods of control. In the province of Quebec, studies were continued on the apple maggot, plum curculio, and apple curculio. In the province of Nova Scotia, further information was obtained on the life-history and distribution of the apple sucker and the green apple bug.

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MOSQUITO INVESTIGATIONS

At Banff, Alta., a mosquito laboratory was established during the year. The officer detailed for this work is a specialist in mosquito experiments and the results of his work conducted in the Rocky Mountains Park in 1922, have been much commented upon. This work, which has been undertaken in co-operation with the Dominion Parks Branch of the Department of the Interior, has indeed been very successful. All the engineering work was devised and directed by our officer, such as proper ditching, filling in of breeding places, etc. In 1922, the mosquito pest was reduced almost to a negligible quantity. The value of this work will be appreciated when one considers the time spent by tourists in such a resort when they find that it is free from these very annoying pests.

GREENHOUSE INSECT INVESTIGATIONS

Several of our entomologists have during recent years devoted particular attention to important pests which cause serious damage to plants grown in greenhouses. As a result of these studies the Branch issued during the year an extensive bulletin entitled "Insects Affecting Greenhouse Plants", well illustrated, which has been supplied to florists and others interested throughout Canada. This bulletin has received the approval of many of our large growers.

INDIAN ORCHARD WORK

As in other years, the Dominion Entomologist has supervised the work of the supervisor of Indian orchards in British Columbia, which officer is employed by the Department of Indian Affairs. During 1922, the officer in charge of this work visited the various Indian reservations in British Columbia in order to assist in connection with agricultural matters, particularly those relating to the protection of trees, etc., from injurious insects.

ADVISORY BOARD ON WILD LIFE

During the year the Dominion Entomologist, as the representative of the Department of Agriculture on the Advisory Board on Wild Life Protection, has attended the meetings of the board. This board is an interdepartmental one, the function of which is to advise the various government departments in matters relating to wild life protection, as well as in advising provinces concerning wild life problems, which they refer to the board.

FIELD LABORATORIES

Annapolis Royal, N.S.—The entomologists attached to this laboratory have paid special attention to the development of spray and dust mixtures, particularly for use in the Annapolis Valley. The increase in the amount of spraying and dusting in this valley is due almost entirely to educational work and effective demonstrations conducted from this laboratory. Considerable extension work in demonstrating cheaper poison baits for insect pests has been undertaken in the provinces of Nova Scotia and New Brunswick. The development of cheaper dusts and improving machinery for distributing the same has resulted in a very large saving.

Fredericton, N.B.—Natural control studies of important insect pests have been continued at this laboratory. Special investigations relating to the apple

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sucker, green apple bug and the spruce budworm, etc., have also been conducted in the province of New Brunswick. An important outbreak of the birch leaf skeletonizer occurred during the year. The fall webworm was also noticeably abundant in many sections, particularly along roadsides. Other insects which were especially complained of are the *Halisidota* tussock moth, salt marsh caterpillar, arbor-vitae leaf-miner, forest tent caterpillar, larch sawfly and larch case bearer.

Hemmingford, P.Q.—The insects which occupied the attention of the officer in charge of this laboratory were the apple maggot, which has caused considerable damage in apple orchards; the raspberry cane-borer, which in some sections destroyed over thirty per cent of the young raspberry shoots; cutworms, particularly complained of on the Isle of Montreal; the saddled prominent, which defoliated sugar maple trees in a strip about one mile wide by about three miles long; and the onion maggot which caused serious losses to onions in some sections. For the latter insect, favourable results were obtained from the use of the sodium arsenite poisoned bait remedy. Several important meetings were attended by the resident officer and timely articles on the control of important pests were published from time to time.

Vineland Station, Ont.—In the Niagara district an extensive outbreak of the grape leaf hopper occurred in 1922. In co-operation with the Niagara District Grape Growers' Association, a campaign against this insect was inaugurated. Meetings were addressed and timely articles published. Further studies were undertaken as a result of which the grape crop was practically saved from the ravages of this insect. Special work was directed by the officer in charge of this laboratory on the rose chafer, pear psylla, plum spider mite, currant sawfly, blackberry leaf miner, potato leaf hopper, etc. Continuing work started in 1921, spraying and dusting experiments were conducted in peach, apple, plum and cherry orchards.

Strathroy, Ont.—The officer in charge of this laboratory paid particular attention during the year to investigations relating to the clover root borer, which is an important pest of clover; the Hessian fly, which during recent years has caused important injury to wheat in western Ontario; the European corn borer; white grubs and other field crop insects. In addition to biological work conducted in this laboratory, the officer in charge has assisted considerably in the inspection of imported nursery stock received by florists and nurserymen in western Ontario.

Port Stanley, Ont.—The laboratory which was established at this point was continued during 1922. It was used as the headquarters for the European corn borer investigations and scouting work conducted in the province of Ontario. During the year several important delegations of farmers from western Ontario and localities in the United States visited the laboratory for the purposes of consultation and also to see fields infested by the corn borer.

Treesbank, Man.—The most important research work conducted during the year by the officer in charge of this laboratory related to the western wheat-stem sawfly, which has increased to an alarming extent in the province of Manitoba and also in sections of Saskatchewan and Alberta. Further experiments were also conducted in an endeavour to improve poisoned baits for grasshopper destruction. Studies were also begun in connection with the Hessian fly, an outbreak of which is expected in 1923. Among the insects which were reported as being prevalent in the province were the beet webworm, the cabbage worm, cucumber beetle, red turnip beetle, etc.

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Saskatoon, Sask.—Investigations at this laboratory related to outbreaks of grasshoppers, beet webworm, cutworms, etc. In this province, as well as in Manitoba, close contact was again maintained with provincial organizations, particularly with regard to the grasshopper campaign. An outbreak of the spruce bark beetle was investigated in northern Saskatchewan.

Lethbridge, Alta.—The officer in charge of this laboratory paid special attention to the pale western cutworm, which is at present undoubtedly the major insect problem of the province. Cultural methods for preventing cutworm injury were conducted with good results in several districts. Grasshoppers were again abundant in the province, over 1,500 townships being infested. A very efficient campaign was launched by the Provincial Department of Agriculture and in this work our officer assisted. Studies of the alfalfa thrips and other insects which attack alfalfa were continued and a survey made to see if the alfalfa weevil had gained a foothold in southern Alberta. It is pleasing to state that this insect was not discovered by our officers.

Vernon, B.C., Agassiz, B.C., Victoria, B.C.—Studies made by the temporary officer in charge of the Vernon laboratory related particularly to the oyster shell scale, oblique banded leaf-roller, the fruit tree leaf roller and a species of thrips which occurs on apple trees. Progress was made in these studies.

At the Agassiz laboratory the officer in charge continued the life history studies and natural control of the satin moth, which has become established in coastal regions of British Columbia. Studies have also been undertaken of the crown borer and cane girdler of raspberries, the currant fruit-fly and the elm currant aphid.

At the Victoria laboratory the officer in charge has continued control experiments in connection with the strawberry root weevil, which work has been highly appreciated by commercial growers. Studies have also been undertaken in connection with the control of important holly insects, the poplar sawfly, etc.

PUBLICATIONS

The following publications have been issued from the Entomological Branch during the year:—

BULLETINS

- No. 19.—The Natural Control of the Fall Webworm in Canada. By John D. Tothill.
- No. 20.—The Morphology and Biology of a Canadian Cattle-Infesting Blackfly. By A. E. Cameron.
- No. 21.—Insects Affecting Greenhouse Plants. By Arthur Gibson and W. A. Ross.

CIRCULARS

- No. 2.—The Date on which it is safe to Reseed Fields in the Prairies after they have been Devastated by the Pale Western Cutworm. By H. L. Seamans and E. H. Strickland.
- No. 4.—Field Crop Insects, Crop Rotation to Offset Injury. By H. F. Hudson.
- No. 12.—How to Foretell Outbreaks of the Pale Western Cutworm in the Prairie Provinces. By H. L. Seamans.

PAMPHLETS

No. 5.—The Strawberry Root Weevil. By W. Downes.

No. 6.—The Western Wheat Stem Sawfly.—By Norman Criddle.

No. 14.—Directions for Collecting and Preserving Insects. By J. H. McDunnough.

No. 30.—The Hessian Fly in the Prairie Provinces. By Norman Criddle.

No. 31.—Aphids or Plant Lice. By W. A. Ross.

In addition to the above departmental publications the officers of the Branch have contributed articles in the *Agricultural Gazette of Canada* as well as in the entomological journals such as *The Canadian Entomologist*, transactions of various societies, etc. Many articles were also prepared by our entomologists for the agricultural press.

THE FRUIT BRANCH

The Department lost a valuable executive officer by the resignation of Mr. C. W. Baxter, who acted as Fruit Commissioner from November 1, 1918, until June 1, 1922, when he undertook the general managership of the Niagara Peninsula Growers, Limited. The work of the branch was carried on by Mr. George E. McIntosh, Fruit Transportation Specialist, as Acting Commissioner until September 1, 1922, when he was appointed Fruit Commissioner.

THE FRUIT SEASON, 1922

Following exceptionally favourable winter and spring conditions, most fruit plants, bushes and trees appeared to be in excellent condition and blossomed in a manner indicative of sufficient vigour to bear heavy crops. This condition was probably brought about by the conservation made possible the year previous when, due to severe spring frosts, which affected most varieties of fruits, extremely light crops were borne. Conditions continued favourable throughout the growing season with the result that a large crop of small fruits, a good crop of apples and a bumper crop of stone fruits was brought to maturity. The commercial apple crop of the Dominion was slightly less than that of 1921 or 3,838,852 barrels as compared with 4,046,813 barrels.

In British Columbia, the spring was very backward in all sections with snow on the ground in the Okanagan until the 8th of April and until nearly the middle of April in the Kootenays. The apple crop was early estimated at from 80 to 90 per cent of the 1921 crop, but the final result showed that approximately 3,000,000 boxes were shipped as compared with 3,172,449 boxes in 1921.

In Ontario, weather conditions were favourable to growth but also particularly favourable to the spread of fungous diseases on apples. The total commercial apple crop was 809,500 barrels, slightly less than the crop of 885,065 barrels in 1921 and very considerably less than the normal production.

In Quebec, the apple crop was 112,500 barrels as compared with 35,200 barrels in 1921 and 88,000 barrels in 1920. Owing to the fact that growth was not rapid throughout the season fungous diseases did not prove particularly injurious although considerable damage was caused by Railroad Worm which has now become a serious pest in this Province.

The apple crop in New Brunswick was 25,000 barrels as compared with 33,000 barrels in 1921.

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In Nova Scotia, the early part of the season was dry and favourable for the setting and development of fruit. Commencing with July, however, and continuing until the middle of September the weather was very wet but, throughout the latter part of September and the month of October, the weather was most favourable for the apple harvest. The commercial crop totalled 1,891,852 barrels as compared with 2,036,065 barrels in 1921. This was the fourth successive heavy apple crop in the Province of Nova Scotia.

Although conditions in Great Britain continued unsettled and the buying power considerably less than normal, the export of apples from Canada was in excess of the exports of the previous season when a greater quantity was exported than for a number of years. The exports from the Province of Nova Scotia alone totalled 1,199,800 barrels.

The average wholesale prices both in Canada and on the export markets were considerably below those of the previous years. In the early part of the season the export markets were strong but, due undoubtedly to the very large shipments, they weakened considerably towards the end of the season and in numerous cases the returns received were not equal to the costs. On the Canadian markets the wholesale prices throughout the year were low, mostly due to the large shipments of inferior quality low grade stock.

The British Columbia shippers were most unfortunate in that the Jonathan variety, which comprises almost one-third of the total crop, developed a breakdown condition which necessitated very many rebates and consequent enormous losses.

The small fruit crop in British Columbia was slightly less than the crop of 1921. The strawberry plants suffered considerably from heaving and later the blossoms were badly damaged by early frosts. Raspberry canes suffered from winter freezing. Other small fruits came through the winter satisfactorily but the production was affected by the lack of moisture during the growing season.

Ontario produced a large crop of all small fruits with the exception of raspberries which suffered slightly from winter injury, and later severely from disease. It is estimated that fully 90 per cent of the total raspberry crop produced in Ontario was sold to the canning and jam factories. Red currants, black currants and gooseberries were an excellent crop.

A bumper crop of practically all varieties of cherries, plums, peaches and pears was harvested throughout Canada. The plum crop was particularly heavy averaging almost 300 per cent in excess of that of 1921. The peach crop in the Niagara District of Ontario was one of the heaviest on record and the fruit was of excellent quality.

CROP REPORTS

Following the usual practice of the Branch, six Crop Reports were issued throughout the growing season commencing with the Fruit and Vegetable Crop Report issued on June 1, and continuing each month until the special Potato Crop Report in November. The list of those from whom crop reports are requested was revised in the early spring and the result was that only those in whom absolute confidence could be placed were requested to submit information. Approximately 1,000 names were added to the Mailing List which now totals 9,200. From time to time throughout the season opportunity was taken of bringing to the attention of the fruit and vegetable growers of the Dominion through these Reports, various special items of interest such as new regulations, Imperial Fruit Show Regulations and matters affecting transportation.

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TELEGRAPHIC MARKET REPORTS

During the past year 68 Telegraphic Market Reports were issued. These were printed once each week except during the heavy fruit marketing season when they were sent out twice weekly. These Reports contain the latest market quotations submitted to the Fruit Branch by telegraph, on all fruits and vegetables on the principal markets throughout Canada. In addition, when the apple export season opens the prices obtaining on the various markets upon which Canadian apples are sold in Great Britain are cabled by the Fruit Trade Commissioner. The rapidly increasing number of applications for these Reports indicates that this service is appreciated by the Fruit and Vegetable Trade.

IMPERIAL FRUIT SHOW

The second Imperial Fruit Show, very similar to the Imperial Fruit Show of 1921, was held at the Crystal Palace, London, England, from October 27 to November 4, 1922. The Canadian exhibits while slightly less in number than those of the previous year, were considerably superior in quality and attractiveness and elicited very favourable comments from the fruit trade and fruit trade journals in Great Britain.

The fruit from British Columbia and Ontario won high honours in the Overseas Section, while Nova Scotia carried off First Prize in the Dessert Classes and Quebec was awarded Second Prize in the British Empire Section.

In addition to the excellence of the fruit, a feature in the whole Canadian Exhibit was the efficiency shown in the grading and packing. These factors brought many high praises from other exhibitors and from visitors to the show, convincing all who saw it, of the superiority of the Canadian product in all that constitutes commercial value.

The Commercial Exhibit from Ontario, the only one from Canada, elicited much favourable comment and was undoubtedly of very great value in advertising the Ontario Fruit on the British markets.

The Fruit Commissioner, at the request of the management of the show acted as Secretary for Canada, distributing full information to all possible Exhibitors and receiving and transmitting the entries and fees.

CANADIAN NATIONAL EXHIBITION

In the building assigned to the Department at the Canadian National Exhibition, August 28 to September 9, 1922, the Fruit Branch made an exhibit which was designed with the primary object of drawing the attention of consumers to the desirability of using Canadian grown fruit for all purposes. The exhibit elicited many enquiries and the advisability of extending work of this kind during the coming year is under consideration.

THE CANADIAN HORTICULTURAL COUNCIL

In compliance with the wish of the horticultural and allied industries of Canada as unanimously expressed through their representatives at the Dominion Fruit Conference held in Ottawa, February 22, 23 and 24, 1922, the organization of the Canadian Horticultural Council was completed. The representatives were called together by the Fruit Branch on May 17, 1922, when the following permanent officers were elected:—

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President, Col. H. L. Roberts, Grimsby, Ont.

First vice-president, F. W. Bishop, Paradise, N.S.

Second vice-president, R. R. Scott, Winnipeg, Man.

Secretary, L. F. Burrows, Ottawa, Ont.

Directors: Jas. Wagstaffe, Hamilton, Ont., W. E. Groves, Hamilton, Ont., W. H. Stewart, Aylmer, Que.

The council has the entire support of the fruit and other horticultural and allied industries in Canada and is of utmost value in that it is now in a position to express, with the least possible delay, the unanimous opinion of these industries as a whole on the numerous questions of vital importance which continually arise.

MEETINGS AND SPECIAL INSTRUCTION WORK

In submitting to Parliament the amendments to the Fruit Marks Act (Inspection and Sale Act, Part IX) recommended by the Sixth Dominion Fruit Conference which met in Ottawa in February, 1922, it was deemed advisable to consolidate the old Act and the proposed amendments. The legislation was therefore submitted as the Fruit Act and, while conforming in the main to the original Act, contains the changes suggested by the Conference, including new grade designations and definitions for apples, crabapples and pears when packed in boxes, some slight changes in the definitions covering barrelled apples and the standardizing of other fruit packages.

INSPECTION SERVICE

Some increase was made in the inspection staff, the number of inspectors in 1922 being 71 as compared with 63 in 1921, the increase being principally due to the extension of territory to cover vegetable production and the administration of the Root Vegetables Act. The work was carried on under the same general policy as during the previous year, the greater part of the inspection being done in the orchards and packing houses, enabling the inspectors not only to examine the fruit, as it is packed but to give practical demonstrations in approved methods of picking, packing, grading and shipping for the various markets.

MEETINGS AND SPECIAL INSTRUCTION WORK

In co-operation with the various Provincial Departments of Agriculture, meetings were arranged in the producing districts when members of the staff, during the off-season for active inspection work, were able to assist in packing demonstrations and to give practical advice on various phases of the fruit and vegetable industry. The inspectors also assisted at short courses in box and barrel packing and in many cases acted as judges at exhibitions. In addition our fruit packing and orchard demonstrator devotes practically all his time to giving instruction in box and barrel packing.

This educational work is much appreciated by growers, packers and shippers and the value of the inspection staff to the industry has been demonstrated by the greatly increased demand during the past year for special instruction work and for special examinations of particular lots, both at shipping point and destination. Lower market values for practically all commodities coming under the jurisdiction of the Fruit Branch created a tendency on the part of consignees

to refuse cars on the slightest pretext and our inspectors' impartial reports have proved of great value in securing satisfactory settlements.

During the summer of 1922, the Canadian Fruit Trade Commissioner, Mr J. Forsyth Smith, spent some time in Canada and meetings were arranged under the auspices of the Fruit Branch in the commercial fruit districts of British Columbia, Ontario and the Maritime Provinces when growers and exporters had an opportunity of meeting Mr. Smith and discussing with him many phases of the export trade and the possibilities of the British and Continental markets for Canadian fruits.

The special service rendered the blueberry shippers and dealers during the past few years was continued, an officer being again stationed in the Lake St. John District during the active shipping season. Arrangements are being made to extend this service during the coming season.

The inspectors in the districts affected again co-operated with the Entomological Branch by reporting any violations of the European corn borer quarantine that came to their attention.

The basket, box and barrel factories in the various provinces were visited systematically in order to ensure an output in accordance with the regulations governing standard packages. Some 250 special reports on inspections of packages were made and in all cases of non-compliance with the regulations, the violation was taken up personally with the offender and in one case prosecution followed.

Prosecutions under the Fruit Marks Act (Inspection and Sale Act, Part IX) were fewer during the past season than for a number of years but all violations were carefully investigated by the district inspector for the district in which the offender lived.

FRUIT STATISTICS

The following table shows the number of lots of various kinds of fruits inspected and the number of packages inspected during the year ending March 31, 1923:—

Variety		Number of lots inspected	Number packages in lots inspected	Number packages inspected
Apples.....	Barrels	11,747	1,308,942	61,532
Apples.....	Boxes	5,777	2,426,888	84,761
Apples.....	Baskets	716	108,131	6,715
Pears.....	Packages	1,052	189,498	10,007
Peaches.....	Packages	2,499	483,989	25,904
Plums.....	Packages	1,343	343,110	15,875
Tomatoes.....	Packages	1,079	189,166	9,175
Small fruits.....	Packages	4,772	606,042	91,911
Grapes.....	Baskets	514	357,035	11,168
		29,499	6,012,801	317,048

THE ROOT VEGETABLES ACT

This legislation, resulting from general recommendations made by the trade for a number of years and in accordance with resolutions passed by representatives of the industry called in conference by the Department in 1920, became effective June 28th, 1922 and provides for the grading of potatoes and onions and certain regulations with respect to the sale of root vegetables. The enforce-

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ment of the Act during the year under review has been largely along educational lines, every attempt being made to familiarize the public with its provisions. In addition to press publicity, over 40,000 copies of the Act (in English and French) were distributed; also some 25,000 window cards which have been handed by our inspectors to the retail trade with a personal explanation of the provisions of the Act with respect to the grading and marking of potatoes and onions and sale by weight. In practically all cases the retailers have expressed their appreciation of the value of the new regulations.

With the exception of five temporary men, who were employed for special work in commercial potato districts, the enforcement of the Root Vegetables Act during the past year has been carried on by the regular fruit inspection staff. Substantial progress has been made and the trade appreciates the advantages resulting from the standardization which is taking place as the result of the regulations. In addition to a large number of informal inspections made during the first few months after the passing of the Act, 1,717 inspections of potatoes, onions and other vegetables were reported. In 476 cases, violations of the Act were shown, 385 of these being concerned with failure to place the proper marks on the bags, barrels or bulk car lots; only in 91 cases was the violation with respect to improper grading.

TRANSPORTATION

Growers and shippers of fruits and vegetables throughout the Dominion look to our Transportation Division for guidance in the various problems involved in the transportation of their products, all more or less highly perishable and in danger of damage or lowered grading by exposure to extreme temperatures, incorrect loading methods or careless handling. Shippers freely request opinion as to the fairness of rates, accommodation or condition of carriage, and for reference our transportation specialist has the advantage of a full file of tariffs covering freight and express rates on fruits and vegetables moving throughout Canada and internationally with the United States, also of direct and cordial contact by correspondence or interview with the principal officers of the transportation companies. Inquiries and representations forwarded by shippers are impartially weighed and where necessary become subjects of correspondence or interview with traffic or operating department officials concerned on behalf of the correspondents or the industry generally. The result of these negotiations, or of adverse opinion supported by technical or tariff reference, frequently avoids hearings before the Board of Railway Commissioners or litigation.

Through the past winter the tenor of most correspondence and interviews pertaining to rates, and of numerous resolutions from meetings of organized growers, has been that the basis of rates applying on fresh fruits and vegetables generally is higher than the industry can be expected to bear. Since 1920 various economic and domestic conditions have joined with abnormal transportation costs in returning to the producer of perishable agricultural products an unusually low proportion of the consumer's dollar, and the producer seeks relief through reduced transportation costs. It is appreciated that the carriers are bearing also an excessive burden in post-war operating costs, including an abnormal scale of wages, fuel and material costs, etc., also statistics show their narrow margin of operating profit. Nevertheless continued losses to the industry will compel economy in orchard maintenance and renewal, resulting inevitably in reduced tonnage for movement by the carriers, and it is hoped the carriers will exercise interested vision in this direction.

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During the year important results accomplished on behalf of the industry in negotiations with the carriers include the following:—

Storage-in-transit privileges at principal centres for potatoes grown in Western Canada, as relief from the menace of frost damage, which also gives growers access to all winter markets; storage-in-transit privileges at principal centres for British Columbia apples for reshipment east of Port Arthur, to United States, and to Atlantic ports for export; storage-in-transit privileges at Grimsby pre-cooling plant for apples.

The Canadian National Express and Dominion Express Companies consented to create a joint carload and L.C.L. rates for fruits and vegetables from British Columbia producing stations on the Dominion Express Company to Canadian National exclusive destinations in the Prairie Provinces, affording wider and very satisfactory distributing privileges for British Columbia fruit.

Arrangements for superheating all refrigerator cars in fruit and vegetable service, to combat the codling moth.

Additional destinations and routings for carload fruit movement from British Columbia.

Reductions obtained in carload freight rate on apples from British Columbia to Atlantic ports for export, and in ocean rate to the United Kingdom.

Reduction of thirty per cent in icing charges for express fruit carload movement when ice supplied from regular icing stations of the Canadian National or Canadian Pacific Railways.

Numerous local adjustments of rates were accomplished where discrimination was established in transportation costs to natural markets. In all such cases the object has been to remove obstacles to free movement and wider distribution of our fruits and vegetables from producer to consumer, increasing volume of traffic more often than decreasing gross earnings of the carriers and especially seeking rate revisions that would assist Canadian producers to meet most favourably foreign competition.

During the winter months, several meetings of fruit growers were addressed on transportation topics and discussion invited on local problems, local grievances produced and explained or negotiated with interested officials of the carriers.

Canadian railways have been very active during the past winter in rebuilding refrigerator cars and in new construction. In view of the comparative excellence of refrigerator car supply for handling last season's abnormal crop of deciduous fruits, though the railways of the United States operating into Canada were hindered by labour troubles from supplying their usual proportion; Canadian railways are confident that even better service can be maintained during the coming season. Certain improvements in icing facilities have been effected which will also expedite this traffic.

PUBLICATIONS BRANCH

DISTRIBUTION OF PUBLICATIONS

A list is submitted of the publications issued by the Department during the fiscal year ended March 31, 1923, and of the number of each received and distributed by the Publications Branch. The publications comprise those that became available for distribution during the year, including reprints. As it is the practice of Branches originating publications to reserve a supply for their own use, the figures given below do not necessarily indicate either the total edition or the complete distribution.

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PUBLICATIONS RECEIVED AND DISTRIBUTED BY THE PUBLICATIONS BRANCH,

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ANNUAL REPORTS

Titles, etc.	Received	Distributed
Agricultural Instruction Act, 1921-22.....	5,000	3,472
Canadian Seed Growers' Association.....	1,000	771
Minister of Agriculture, 1922.....	5,000	2,655
The Canadian record of performance for pure-bred dairy cattle, Report No. 14.....	4,000	2,251
The Canadian record of performance for pure-bred poultry, Section "A", 1921-22; Report No. 3.....	2,760	2,277
Veterinary Director General, 1921.....	2,350	2,158
<i>Experimental Farms Branch—</i>		
Director, Dominion Experimental Farms.....	14,275	9,396
Dominion Chemist.....	9,591	8,576
Dominion Field Husbandman.....	19,000	10,607
Dominion Animal Husbandman.....	11,990	2,986
Dominion Horticulturist.....	12,300	6,385
Dominion Cerealists.....	5,000	2,664
Division of Botany.....	5,775	5,395
Dominion Apiarist.....	7,000	6,216
Dominion Agrostologist.....	6,600	4,000
Dominion Poultry Husbandman.....	14,225	10,742
Tobacco Division.....	9,130	4,434
Division of Economic Fibre Production.....	500	500
Division of Illustration Stations.....	9,160	7,370
<i>Experimental Farms Interim Reports—</i>		
Experimental Station, Charlottetown, P.E.I.....	5,000	2,872
" " Kentville, N.S.....	6,480	2,500
" Farm, Nappan, N.S.....	6,500	3,983
" Station, Fredericton, N.B.....	7,500	1,622
" " Ste. Anne de la Pocatiere, Que.....	2,000	1,507
" " Cap Rouge, Que.....	3,800	2,833
" " Lennoxville, Que.....	8,500	2,959
" Kapuskasing, Ont. and La Ferme, Que.....	5,000	4,977
" " Morden, Man.....	5,000	4,895
" Farm, Brandon, Man.....	5,800	4,700
" " Indian Head, Sask.....	5,000	1,036
" Station, Rosthern, Sask.....	9,150	8,788
" " Scott, Sask.....	18,200	18,020
" " Lethbridge, Alta.....	11,128	9,823
" " Lacombe, Alta.....	10,992	10,872
" " Summerland, B.C.....	10,031	9,606
" " Invermere, B.C.....	6,000	3,165
" Farm, Agassiz, B.C.....	5,600	5,314
" Station, Sidney, B.C.....	4,850	4,100
" Sub-stations, Beaverlodge, Alta.; Fort Vermilion, Alta.; Grouard, Alta.; Fort Smith, N.W.T.; Fort Resolution, N.W.T.; Swede Creek, Yukon; Salmon Arm, B.C....	5,350	3,260

BULLETINS, PAMPHLETS, CIRCULARS, ETC.

<i>Experimental Farms Branch—</i>		
Results of experiments at Fort Vermilion, Alta., by Robt. Jones, Bull. 6....	6,000	3,072
Fertilizers for field crops, by F. T. Shutt and B. L. Emslie, Bull. 8.....	10,000	5,118
New varieties and selections of grain (Originated on the Dominion Experimental Farms), by Chas. E. Saunders, Bull. 11.....	8,000	4,962
Pigeons, by Geo. Robertson and W. W. Lee, Bull. 15.....	6,050	2,690
Root and storage cellars, by A. V. Nicholson, Pamp. 10.....	18,000	2,760
Best varieties of grain, Pamp. 11.....	6,200	6,200
How to caponize, by Geo. Robertson and W. W. Lee, Pamp. 12.....	8,000	3,435
Finishing steers for market, N. W. Saskatchewan, by M. J. Tinline, Pamp. 17.....	19,100	17,270
Winter steer feeding in Manitoba, by W. C. McKillican, Pamp. 18.....	11,000	10,120
The winter finishing of steers in Western Quebec, by J. A. McClary, Pamp. 19.....	7,000	6,332
The winter feeding of beef cattle in Ontario, by G. W. Mair and S. J. Chagnon Pamp. 21.....	27,650	26,213
The winter finishing of steers in Western Nova Scotia, by W. W. Baird, Pamp. 20.....	10,000	6,625
"Seasonable Hints".....		774,910
Wintering bees in Canada, by C. B. Gooderham, Pamp. 22.....	10,000	775

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PUBLICATIONS RECEIVED AND DISTRIBUTED BY THE PUBLICATIONS BRANCH.

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BULLETINS, PAMPHLETS, CIRCULARS, ETC—*Concluded*

Titles, etc.	Received	Distributed
<i>Experimental Farms Branch—Concluded.</i>		
Steer feeding experiments in Prince Edward Island, by J. A. Clark, Pamp. 23	5,000	2,700
Is cow testing worth while? by A. H. White, Pamp. 24	14,800	4,520
In the trough of the wave, by W. D. Albright, Pamp. 26	50	48
Meilleur cheese, by S. J. Chagnon and Jos. Meilleur, Pamp. 27	5,000	3,245
Mosaic and leaf curl of the cultivated red raspberry, by J. F. Hockey, Cir. 1.	200	120
<i>Dairy Branch.—</i>		
The testing of milk, cream and dairy by-products by means of the Babcock Test (Reprint) by J. F. Singleton, Bull. 14, N.S.	4,537	447
Small cold storages (Reprint) by J. A. Ruddick and J. Burgess, Bull. 16.	1,800	230
Simple methods for the storage of ice (Reprint) by J. A. Ruddick and Jos. Burgess, Pamp. 2	8,000	7,500
Why and how to use cheese, by H. G. Campbell, Pamp. 7	60,000	25,847
Keeping dairy herd records, Pamp. 13	13,000	11,825
The cooling of milk for cheese making (Reprint), by J. A. Ruddick and Geo. H. Barr, Pamp. 28	4,900	267
Why and how to use milk, by H. G. Campbell	101,200	96,860
Why and how to use skim milk, by Helen G. Campbell, Cir. 5	102,000	21,950
Why and how to use cream, by Helen G. Campbell, Cir. 6	101,000	25,135
Why and how to use cottage cheese, by Helen G. Campbell, Cir. 7	70,000	22,205
Why and how to use buttermilk, by Helen G. Campbell, Cir. 8	50,000	22,965
The branding and marking of cheese and butter boxes, by J. A. Ruddick, Cir. 9	4,000	3,886
<i>Live Stock Branch.—</i>		
Swine husbandry in Canada (Reprint), by J. B. Spencer, Bull. 10	23,120	10,758
Dressing and cutting lamb carcasses, by A. A. McMillan and W. J. Howard, Pamp. 8	9,900	8,355
Selection of lamb cuts, directions for cooking, by A. A. McMillan, Pamp. 9	12,000	9,925
Dehorn your commercial cattle, cater to higher market prices, by P. E. Light and G. B. Rothwell, Pamp. 15	83,000	82,403
Manitoba improved flocks, by A. C. McCulloch, Pamp. 25	3,000	2,523
<i>Seed Branch.—</i>		
Cleaning seed, by G. H. Clark, Pamp. 4	20,000	1,190
Oat hulls and their use in feeding stuffs, by A. Eastham and V. L. Baker, Cir. 11	20,000	1,305
<i>Fruit Branch.—</i>		
List of wholesale dealers in fruit and vegetables in Canada, Bull. 9	10,000	4,170
<i>Health of Animals Branch.—</i>		
Fox ranching in Canada, by J. A. Allen and J. E. Smith, Bull. 12	9,900	8,854
Bovine tuberculosis, questions and answers, by F. Torrance, Pamp. 16	10,000	8,071
How to prevent goitre in new born lambs, calves and other animals, hairless pigs, by F. Torrance, Cir. 3	10,000	9,917
<i>Entomological Branch.—</i>		
The natural control of the fall webworm, by J. D. Tothill, Bulletin 3	1,740	429
The morphology and biology of a cattle-infesting black fly, by A. E. Cameron, Bull. 5	1,600	437
Insects affecting green house plants, by Arthur Gibson and E. A. Ross, Bull. 7	14,135	3,638
The strawberry root weevil, by W. Downes, Pamp. 5	4,117	3,792
The western wheat stem sawfly and its control, by N. Criddle, Pamp. 6	6,000	3,757
Directions for collecting and preserving insects, by J. H. McDunnough, Pamp. 14	2,400	700
The Hessian fly in the Prairie Provinces, by N. Criddle, Pamp. 30	3,500	1,379
Aphids or plant lice, by W. A. Ross, Pamp. 31	5,600	3,080
Field crop insects, crop rotation to offset injury, by H. F. Hudson, Cir. 2	3,500	2,865
The date on which it is safe to re-seed fields in the Prairie Provinces after they have been devastated by the pale western cutworm, by H. L. Seamans and E. H. Strickland, Cir. 4	2,000	1,083
<i>Publications Branch.—</i>		
List of publications, 1922	40,000	38,000
List of publications, 1923	30,000	5,805
The Agricultural Gazette of Canada		8,316

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PUBLICATIONS RECEIVED AND DISTRIBUTED BY THE PUBLICATIONS BRANCH,
FISCAL YEAR, 1922

ACTS, ORDERS AND REGULATIONS

Titles, etc.		Received	Distributed
No	1- Boys' cattle breeding clubs	24	12
"	2—European Corn-borer quarantine	75	19
"	3—The Root Vegetables Act.....	5,000	4,282
"	4—Fruit and fruit packages	1,000	250
"	5—European Corn-borer quarantine No. 2 (Domestic) 2nd revision.	51	
"	6—The Dairy Produce Act.....	4,000	2,865
	Regulations respecting the grading of hogs	150	
	Grading and marking of eggs.....	1,000	180
	Animal Contagious Diseases Act.....	49	
	Oleomargarine Act.....	49	49
	Live Stock and Live Stock Products Act.....	100	35
	Fertilizers Act.....	4,500	3,453

MAILING LISTS

General List—On March 31, 1922, the general mailing list comprised 189,754 English and 43,254 French names; total 233,008. On the corresponding date in 1923, it comprised 212,968 English and 45,974 French names; total 258,942. The net gain for the year was 25,934 names.

	Number of Names	
	English	French
<i>Special List.</i> —		
Officials, Federal and Provincial.....	472	193
Libraries.....	305	3
Newspapers.....	921	71
Members of Parliament and Senators.....	246	78
Members of Provincial Legislatures.....	448	106
Exchanges, British and Foreign, Consuls, and Miscellaneous.	88	80
Totals.....	2,480	531
<i>Branch Lists</i>		
Live Stock (11).....	13,119	50
Dairy (3).....	4,464	3,052
Seed (15).....	5,982	1,791
Entomological (8).....	1,764	16
Fruit (3).....	6,944	
International Institute of Agriculture (9).....	997	197
Totals.....	33,220	5,106
<i>Agricultural Gazette of Canada.</i> —		
Agricultural Colleges.....	112	31
Dominion Government Officials.....	44	6
Members of Parliament.....	175	55
Senators.....	71	23
Federal Department of Agriculture Officials.....	306	20
Members of Provincial Parliaments.....	448	106
Provincial Departments of Education (including teachers of agriculture) ..	3,082	837
Provincial Departments of Agriculture Officials.....	211	69
Agricultural Representatives.....	89	67
Agricultural Societies and Associations.....	102	3
Newspapers and Farm Journals.....	941	71
Public Libraries.....	305	3
Consuls.....	27	11
Foreign Exchanges, etc.....	246	75
Unclassified.....	157	20
Paid Subscribers ..	217	118
United States Official List.....	268	
Totals	6,801	1,515

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Except in a few special cases, the publications of the Department are sent free on request. *Seasonable Hints*, a leaflet issued by the Experimental Farms Branch every four months, is despatched to all whose names appear on the General List. This is accompanied by a supplementary List of Publications. Those who desire to obtain any of the publications listed therein mark the slip and return it to this Branch.

The following table shows the gain made in the number of names on the General List during the year:—

	English	French	Total
March, 1922	189,774	43,254	233,008
July, 1922.....	202,218	44,337	246,555
November, 1922	207,617	45,070	252,667
March, 1923.....	212,968	45,974	258,942

Gain in year—27,444 names.

The Special List comprises newspapers, members of parliament, officials, libraries, consuls, exchanges, etc. To this list, all publications are despatched, as issued.

The Branch Lists comprise the names of selected individuals and firms who are specially concerned in publications of that Branch. The publications of a Branch are sent to the Branch's list, on instructions to that effect.

The Agricultural Gazette of Canada is not intended for general free distribution. It is sent without charge to official workers, to qualified agricultural teachers, to members of parliament, libraries, the press, immigration and trade agents in Canada and to agricultural institutions, libraries, journals, etc., in other parts of the Empire and foreign countries.

ADDRESSING AND REVISION

The foregoing lists are addressed from embossed plates by automatic machinery, and the lists are constantly under revision.

The principal sources from which additions are made to the General Mailing List are as follows: applications for publication; direct requests; Extension and Publicity Division, Experimental Farms Branch; Soldier Settlement Board; responses to advertisements; revised lists from Members of Parliament; Grain Growers' locals; cheese and butter factory patrons. During the year under review, mailing list application cards were sent to teachers in rural schools for distribution to pupils. By this means parents were advised of the free distribution of Departmental publications.

DISTRIBUTION

The number of publications despatched during the year in response to requests was 887,630, being an increase of 45,836 over the year previous. Including the publications and other documents sent to lists, the total number despatched was 2,041,871, *Seasonable Hints* (774,910) and multigraphed or printed circulars being taken into account.

The number of envelopes addressed from lists by automatic machinery was 1,567,582, and the number addressed by hand to supply direct requests was 126,670.

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To maintain the supply of publications, a report is made to each Branch every month as to the number of copies on hand of publications that are nearing exhaustion.

DUPLICATING AND MAILING

Duplicating work is performed for several Branches. The output of the duplicating machines was as follows:—

	1921-22	1922-23
Circulars, form letters, regulations, etc.,—pages.....	100,846	128,932
Press articles—copies.....	35,888	33,966
Entomological News Letter—Pages.....	7,176	9,406
Totals	143,910	172,304

The number of circulars printed or multigraphed, despatched during the year was 817,478, as compared with 608,070 in the year previous. These included the Dairy News Letter (monthly) and the Daily Market Report (weekly, April to December) for the Dairy and Cold Storage Branch; the Egg Market Report (weekly) for the Live Stock Branch; and the Entomological News Letter (monthly) for the Entomological Branch; the Fruit and Vegetable Crop Report (June to October) and the Potato Crop Report (December) for the Fruit Branch. The circulars enumerated, with the exception of the Entomological Branch, are duplicated or printed by the originating Branches.

PRESS ARTICLES

Press articles, prepared or edited by the Publications Branch, to the number of 578, were distributed to the various sections of the press, compared with 484 in 1921-22. These articles chiefly comprise notices of publications, and their object is to stimulate demand. In addition, as occasion arises, news items, articles advising the public of new legislation, regulatory measures, policies, insect and plant disease outbreaks, and digests of addresses, etc., are prepared and despatched.

The distribution was as follows:—

	Number
Agricultural journals.....	194
Weekly newspapers.....	303
Daily newspapers.....	26
French press.....	51

The following figures show the number of articles in their relationship to the various Branches:—

	Number
Experimental Farms Branch.....	233
Dairy and Cold Storage Branch.....	84
Entomological Branch.....	34
Live Stock Branch.....	76
Seed Branch.....	32
Fruit Branch.....	28
Health of Animals Branch.....	37
Publications Branch.....	22
Miscellaneous.....	32
Total.....	578

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THE INTERNATIONAL INSTITUTE BRANCH

The meeting of the Sixth General Assembly of the International Institute of Agriculture was held in Rome from the 8th to the 16th of May, 1922. It was attended by representatives from fifty-one different countries. The Canadian representatives were Dr. A. T. Charron and Mr. W. A. Wilson.

The economies effected by the resolutions passed concerning the reorganization of the work of the Institute will enable certain developments on that work to be undertaken, such as the more frequent issue of special reports or monographs on subjects of general interest, the establishment of an improved system of bibliography, and the development of the statistical service by the more extended use of the telegraph in the collection and distribution of information on crop areas, forecasts and yields, as well as other urgent information.

Among the resolutions agreed to by the General Assembly may be mentioned: the importance of agricultural book-keeping and "costings"; an inquiry into the prevention of the olive fly; collection of information as to milk recording; the desirability of centralization at the Institute of a complete record of the work of various phytopathological institutes; the development of agricultural meteorology; an inquiry as to the supply of artificial manures and the republication of a monograph on this subject which has been for some time out of print; and the collection of information as to the losses caused to agriculture by insect and fungous pests.

The Institute, in common with the League of Nations and the International Labour Office, upon invitation, sent to the Genoa Economic Conference of the Allied and other Powers a delegation of experts with the object of furnishing the conference with any information relating to agriculture which might be required. The following recommendations of the conference show that the value and international position of the Institute in agricultural affairs was appreciated:—

"Agriculture being from the economic and social point of view an essential factor in the reconstruction of Europe, it is desirable that the States should encourage in every way the development of agricultural production. It is further desirable that the States should give special attention to the labours of the International Institute of Agriculture and that, in development of the practice of holding international agricultural congresses, the agricultural representatives of the various countries concerned, both of the Government and of the industry, should meet in international conference, to agree upon the measures to be recommended to their respective Governments."

In accordance with the recommendations made by the General Assembly, the Institute has made radical changes in the form and publication of its three regular bulletins. Beginning with the January, 1923, issue the three sections of the *International Crop Report*, hitherto dealing respectively with agricultural production and live stock, with imports, exports and cereal stocks, and with prices, are condensed into a single monthly publication. Considerable innovations have been effected, more especially as regards price and trade figures. The price tables now include index numbers for the principal quotations, taking as 100 the average weekly figures of 1913, the last complete pre-war year. The price fluctuations for the various products on sundry markets are thus shown with greater clearness, so that it is not difficult to draw interesting comparisons as to period and locality. There are also tables giving prices and ocean freight rates reduced to cents on the basis of American weights and

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the day's rates of exchange. The section relating to production includes the latest reports on crop prospects and crop yields in the different countries. The trade section comprises world's totals of imports and exports of different products and the best available information as to the supplies that are likely to be available in exporting countries and the probable requirements of importing countries. This section is therefore of direct and immediate value to the grain trade of the world by helping producers and distributors to form an accurate estimate of probable supply and demand. The report will also comprise a few brief articles, from time to time summarizing any noteworthy conclusions arising from the available statistical material.

From 1923 onwards the *International Review of the Science and Practice of Agriculture*, hitherto published as a monthly, will be published quarterly. The aim of the Review is to continue to keep agriculturists informed in regard to progress in the science and technique of farming, agricultural industries and live stock improvement, plant diseases and methods for their control. More space will in the future be given to original articles. The most important questions of the moment will be dealt with by leading specialists in the various countries. In order to render the work of the Institute still more effective a special, carefully co-ordinated series of articles will elucidate the principal agricultural problems of international importance. A new section will hereafter be included consisting of current notices relative to agricultural movements, legislative and administrative measures, agricultural institutes, congresses, meetings, exhibitions, fairs, etc., of international interest. This section is of importance as it is compiled from international sources, because the Institute is the only centre which receives the agricultural publications of the entire world and has also at its disposal special correspondents or bureaus in the various countries.

The *International Review of Agricultural Economics*, beginning with this year, is also transformed from a monthly into a quarterly review. It will continue to deal with agricultural co-operation, agricultural insurance, credit, the economic and social conditions of the agricultural classes, land systems, etc. Greater variety and general interest will be given to the articles by having recourse to outside contributors.

During the year the eleventh volume of the *International Year Book of Agricultural Legislation* was published. It contains the more important legislation on agriculture enacted in the different countries in 1921. The legislation of 1921 is chiefly concerned with the grave post-war economic, social and technical problems affecting agriculture. The social question is to the fore, and its importance is evidenced by a whole series of measures on land tenure, farm leases, social insurances and credit.

The International Institute Branch of this Department as usual furnished the Institute at Rome with the information concerning agriculture in Canada necessary in its work. Cablegrams giving the condition and forecasted yields of crops were regularly sent, as well as the statistics of imports and exports. Articles and monographs for the two Reviews and for use in the different special publications of the Institute were prepared.

The International Reviews and the Crop Report were distributed to selected lists of officials and agronomists throughout Canada. Summaries of those articles in the two Reviews which were of special interest to Canadians were made and published in the *Agricultural Gazette of Canada*.

The cabled foreign crop reports received from the Institute were immediately made available to the newspapers of Canada through the medium of

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"The Canadian Press," and a large number of correspondents were furnished with statistical information on the world's crops and live stock, trade in agricultural products and prices. Several articles on the world's food supply and demand, with special reference to wheat, were published in the *Agricultural Gazette*, as well as an article on the world's live stock, giving details of the numbers of live stock in the different countries compared with pre-war numbers.

The number of requests for information on agriculture in Canada and in other countries is rapidly increasing and a great deal of such information was sent to correspondents throughout the country. Many foreign Government offices were also provided with data concerning Canadian agriculture. A comprehensive monograph on ocean freight rates was prepared for the Special Committee of the House of Commons Investigating Agricultural Conditions.

STATISTICAL REPORT OF THE LIBRARY

—	Borrowers			Books		
	1920-21	1921-22	1922-23	1920-21	1921-22	1922-23
Department of Agriculture, Ottawa.....	80	101	122	752	1,093	1,487
Ottawa (exclusive of Department of Agriculture.....	115	139	163	1,009	1,266	1,004
Ontario, exclusive of Ottawa.....	67	92	100	330	587	571
British Columbia.....	29	45	44	111	273	290
Alberta.....	16	27	29	65	197	142
Saskatchewan.....	16	46	40	121	243	330
Manitoba.....	17	47	34	58	281	249
Quebec.....	50	104	98	222	527	538
Prince Edward Island.....	6	12	10	21	64	114
New Brunswick.....	9	24	20	32	133	100
Nova Scotia.....	7	19	15	24	112	155
United States.....	3	5	6	9	40	49
Total.....	415	661	681	2,754	4,816	5,029

(These figures do not include use of books in the library).

	1920-21	1921-22	1922-23
Bound volumes received.....	1,345	1,393	1,455
Total bound volumes in library.....	8,978	10,371	11,826
Periodicals (pieces) received.....	12,561	12,717	15,297
Pamphlets received.....	10,692	10,483	9,587
L. C. cards received.....	8,346	6,190	5,368
Number of cards in catalogue.....			231,000 (approximately)

Respectfully submitted,

W. R. MOTHERWELL,
Minister of Agriculture.